W.A. CLEARY CHEMICAL CORPORATION
1049 SOMERSET STREET
FRANKLIN TOWNSHIP, SOMERSET COUNTY, NEW JERSEY
EPA ID # NJD002164457

GENERAL INFORMATION AND SITE HISTORY:
The W.A. Cleary Chemical Corporation has been in operation at the facility located at 1049 Somerset Street in Franklin Township, Somerset County, New Jersey since 1946. The facility presently consists of four buildings on 136 acres of which 8 acres are used for manufacturing operations. The rest of property owned by the company has been developed as the Tara Greens Golf Course and Driving Range. W. A. Cleary produces food additives and agricultural chemicals including pesticides, herbicides, fungicides and green coloration for plant sprays.

Land use in the vicinity of the site is a mixture of residential, commercial and light industrial. North and east of the site are more densely populated areas of Somerset Boro and the City of New Brunswick. Land use to the south is predominantly commercial and light industrial with some residential areas. The area to the west of the site is also light industrial becoming more rural farther away from the site. The approximate population within a four mile radius of the site is 103,000.

SITE OPERATIONS:
Agricultural chemical manufacturing operations have been performed in the chemical plant since 1946 and in the area designated as "the still" during the period from 1946 to 1977. The still area was an open-walled, roofed structure which covered two manufacturing reactor systems. These systems were used in the production of phenylmercuric acetate (1946 to 1977), phenylmercuric oleate (1960 to 1965), mercuric napthenate (1960 to 1965) and disodium methyl arsonate (1968 to 1969). Upon completion of the reactor process, contents of the reactor systems were transferred to the chemical plant for further processing.

The plant area is an enclosed masonary building which was used for the filtration, drying and blending of solids in addition to its present use for blending and adjusting. Equipment in the chemical plant is/has been used for the manufacture of products made from the concentrated materials produced in the still and other agricultural chemicals from blending operations.

Cadmium oxide and nitric acid are charged to stainless steel drums which are agitated by a portable mixer located in an area between the still area and the chemical plant. After the addition of sodium chloride, the resulting cadmium chloride solution is transferred to the chemical plant for further processing. (See attachment C page, 3 for raw materials list).

Soil and groundwater contamination at the site has for the most part been attributed to operations in the still and chemical plant areas. Accidental spills of finished product and raw materials in the still area discharged to the immediate ground surface adjacent to the area. Spilled material from equipment housed in the chemical plant building was collected in a trough that discharged to an underground pipe which conveyed the waste to a clay lined chemical waste lagoon. A sink located in the quality control laboratory, also housed within the chemical plant, discharged to the

facility sanitary septic system until 1985, when the sink line was diverted to the chemical lagoon. The suspected presence of a second former lagoon located east of the still has been denied by company officials who claim that the area was just a depression that collected rain runoff from the still area roof. According to W. A. Cleary Officials, the heavy contamination of mercury found in this location is due to residuals washing from discarded mercuric oxide containers which were exposed to the weather.

GROUNDWATER ROUTE:

A. GEOLOGY/TOPOGRAPHY

Bedrock at the W. A. Cleary site is identified as Brunswick Shale of Triassic Age. The Brunswick Shale at the site consists primarily of interbedded, reddish mudstone and siltstone. The bedrock beds are generally inclined in a northwesterly direction at an average angle of 17 degrees. The depth to bedrock ranges from a few inches to 10 feet below the surface. Soils at the site are basically silt loams and silty clay loams that have a relatively low permeability.

B. HYDROGEOLOGY

The Brunswick Shale is a major water bearing aquifer in portions of northeastern and central New Jersey and is the main aquifer in Franklin Township. Joints and intersecting fractures provide the principal means of groundwater flow in the Brunswick Shale. The site has eleven shallow monitoring wells ranging in depth from 30 to 60 feet and six deep monitoring wells ranging in depth from 72 to 335 feet below the surface. Monitoring well data from the site indicates that the Brunswick Shale is divided into two aquifers. Groundwater in the shallow aquifer is under water table conditions and is encountered at depths ranging from 4 to 22 feet below the surface. Ground water in the deeper bedrock is encountered at depths of 18 to 30 feet below grade. Groundwater flow in the shallow aquifer is radially away from a mound in the hydraulic gradient that is present beneath the area of the still and the chemical plant. Tests indicate the mound is related to localized high topography, since surface waters present in the area (the well water pond, ponded water near the former chemical lagoon and other excavations) do not appear to be a major contributing source to the groundwater mound. Groundwater in the deeper bedrock flows to the southeast.

Monitoring well sampling analyses dating to 1983 have shown groundwater at the site to be contaminated with arsenic, volatile organics and pesticides. Sampling results, contained in a hydrogeologic and soil investigation completed by Dan Raviv Associates, W. A. Cleary's environmental contractor in 1987, show that shallow monitoring well No's 3s, 5, 6, and 7 have the highest contamination levels. Substances found in these wells are as follows: arsenic (3040 ppb), benzene (820,000 ppb), carbon tetrachloride (3,400,000 ppb), chloroform (6000 ppb) and 2,4-D (5,200 ppb). Similar contaminants are found at lower concentrations in samples collected from the deeper monitoring wells.

Groundwater in the site area is utilized for potable and industrial purposes. NJDEP, Division of Water Resources well records indicate that several industrial wells and approximtely 335 private domestic

wells are located within a 4 mile radius of the site. Most wells within the site area are screened in the deeper Brunswick Formation aquifer.

One municipal well, owned by the Middlesex Water Company, is located approximately 3 miles northwest of the site and is screened at a depth of 351 feet, also in the Brunswick Formation.

SURFACE WATER ROUTE:
Wastewater from the food additive building, consisting primarily of vegetable oils and lecithins, is intermitantly discharged to the Mile Run via NJPDES Discharge to Surface Water Permit No. NJ0003816. Mile Run in turn flows into the Raritan River approximately three miles from the site. The permitted discharge is through three "settling ponds," consisting of one underground cinder block tank used to digest vegetable oils, one bentonite lined lagoon and one unlined lagoon. The two lagoons are located on the golf course and, with the tank, are connected in series by ditches and underground pipes.

Non-recyclable wash water from the agricultural chemical plant was discharged to a clay lined chemical lagoon which was closed in accordance with the company's NJPDES permit in 1986. The 8000 square foot chemical lagoon was subject to overflowing and has been alleged to be responsible for much of the soil contamination at the site. The closure of the chemical lagoon included the removal of all wastewater, sludge and its clay lining along with the top one foot of soil which was excavated from an area of over 3 acres.

The site is located on the divide between land that drains toward Mile Run and land that drains toward a tributary of Six Mile Run which flows into the Millstone River. The Millstone converges with the Raritan River several miles upstream of its confluence with Mile Run. Documentation indicates that surface runoff and overflow from the settling ponds and, previously, the chemical lagoon would flow south toward the tributary of Six Mile Run which is approximately one half mile from the site. The North Brunswick Water Department has a surface water intake on the Millstone River-Delaware Raritan Canal upstream of the Six Mile Run convergence point. There is no potential for contamination of surface drinking water. The Raritan River and Millstone River are also both utilized for recreational fishing and in some places swimming, even though no areas are officially designated for that purpose. The nearest wetlands to the site are located along the Six Mile Run approximately 1.5 miles from the site. Sediment samples taken from a stream which flows through the Tara Greens Golf Course and discharges to Mile Run revealed contamination by arsenic (47 ppm), cadmium (2.9 ppm) mercury (6.1 ppm) and volatile organic compounds (0.97 ppm total).

AIR ROUTE:
Documentation indicates that during the manufacture of phenylmercuric acetate, (PMA) approximately 5.75 pounds of benzene were lost to evaporation per hour. W. A. Cleary discontinued making PMA in 1981. Presently the company has no air pollution permits related to the chemical manufacturing part of the facility. Currently there is a potential for contamination of air if contaminated soils are disturbed.

SOILS:
Extensive sampling at the site by NJDEP and Dan Raviv Associates Inc., W. A. Cleary's consulting firm, has shown soils at the site to be contaminated with arsenic (up to 950 ppm), cadmium (up to 250 ppm), mercury (up to 110,000 ppm) and volatile organic compounds (up to 1.93 ppm total VOC). Areas having the highest levels of contamination were south and east of the still. Approximately 3 acres of contaminated soil around the lagoon and the still were removed to a depth of 1 foot and manifested for offsite disposal. However, contamination levels exceeding NJDEP standards exists down to bedrock at 8 feet. Additional sampling and removal of contaminated site soils is scheduled. Other areas of the site that have been shown to be contaminated by the arsenic, cadmium and mercury at lower concentrations are the septic pit, the stream running through the golf course and the golf course itself. Sampling conducted during a National Dioxin Study in 1984 revealed one area that is contaminated by dioxin at a concentration of 35 ppb.

DIRECT CONTACT:
The site property, including the Tara Green Golf Course, is not secured by fencing. A potential for direct contact exists due to public access to areas that are contaminated.

FIRE AND EXPLOSION:
Due to the nature of some of the materials used in the manufacturing process, a potential for fire and explosion exists.

WORKER EXPOSURE/INJURY:
A 1982 OSHA report states that workers were exposed to Thiram, an active ingredient of fungicides. Due to the high levels of contamination at the site, it is likely that additional worker exposure had occurred.

OTHER CONSIDERATIONS:
Flora and fauna in downgradient surface waters may be impacted by contaminants from the site. Due to the high levels of mercury found at the site, there is a potential for contamination of the food chain.

Unstable containment of waste had been observed during a NJDEP site inspection in 1980. Soil samples collected at that time from around the chemical lagoon, which showed evidence of overflowing, revealed contamination by arsenic, cadmium and mercury.

ENFORCEMENT ACTIONS:
In accordance to a NJDEP/Division of Water Resources Consent Order signed in 1982, an extensive soil and groundwater remedial investigation program and site cleanup was implemented by W. A. Cleary and continues at this time. To date, in addition to soil and groundwater sampling, all wastewater, sludge and the clay lining from the chemical lagoon have been removed from the site. Contaminated soil down to a depth of 1 foot has also been removed from an approximately 3 acre area around the lagoon and still. The lead agencies for the site have been the NJDEP Division of Water Resources, Bureau of Ground Water Quality Management and the NJDEP DWR Northern Regional Enforcement Office. At the time of this writing, W. A. Cleary has also come under the jurisdiction of ECRA due to the intended sale of part of the site property.

RECOMMENDATIONS:
Based on the documentation reviewed, the W. A. Cleary site is assigned a high priority. Due to the extensive amount of sampling and remedial work that has already been completed, a Site Inspection Review is in progress and sampling is not waranted at this time.

Prepared by:

Robert Raisch, HSMS III
Bureau of Planning and Assessment
May 1988

Hrs. 72

Preliminary Assessment

W.A. CLEARY CHEMICAL CORPORATION
1049 SOMERSET STREET
FRANKLIN TOWNSHIP, SOMERSET COUTNY, NJ
EPA ID# NJD002164457

Hrs 72

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 1 - SITE INFORMATION AND ASSESSMENT

EPA

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NJ	D002164457

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER				
W.A. Cleary Corporation	1049 Somerset Street				
03 CITY	**04 STATE**	**05 ZIP CODE**	**06 COUNTY**	**07 COUNTY CODE**	**08 CONG DIST**
Franklin Township	NJ	08873	Somerset	18	
09 COORDINATES LATITUDE	LONGITUDE				
40° 28' 47".__	24° 29' 17".__	Block 88.01 Lot 6			

10 DIRECTIONS TO SITE (Starting from nearest public road)

Route 206 N to 27 N. W.A. Cleary is located off Rt. 27 N on left past Veranico Ave., behind the Tara Greens Golf Course.

III. RESPONSIBLE PARTIES

01 OWNER (If known)	02 STREET (Business, mailing, residential)			
Margaret A. Cleary	P.O. Box 10-1049 Somerset St.			
03 CITY	**04 STATE**	**05 ZIP CODE**	**06 TELEPHONE NUMBER**	
Somerset	NJ	08873	(201) 247-8000	
07 OPERATOR (If known and different from owner)	**08 STREET** (Business, mailing, residential)			
09 CITY	**10 STATE**	**11 ZIP CODE**	**12 TELEPHONE NUMBER**	
			( )	

13 TYPE OF OWNERSHIP (Check one)

☒ A. PRIVATE ☐ B. FEDERAL: _____ (Agency name) ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL

☐ F. OTHER: _____ (Specify) ☐ G. UNKNOWN

14 OWNER/OPERATOR NOTIFICATION ON FILE (Check all that apply)

☐ A. RCRA 3001 DATE RECEIVED: ___/___/___ (MONTH DAY YEAR) ☐ B. UNCONTROLLED WASTE SITE (CERCLA 103 c) DATE RECEIVED: ___/___/___ (MONTH DAY YEAR) ☐ C. NONE

IV. CHARACTERIZATION OF POTENTIAL HAZARD

01 ON SITE INSPECTION

☒ YES DATE 2/1/87 (MONTH DAY YEAR)
☐ NO

BY (Check all that apply)

☐ A. EPA ☐ B. EPA CONTRACTOR ☐ C. STATE ☒ D. OTHER CONTRACTOR
☐ E. LOCAL HEALTH OFFICIAL ☐ F. OTHER: _____ (Specify)

CONTRACTOR NAME(S): Dan Raviv Associates

02 SITE STATUS (Check one)

☐ A. ACTIVE ☐ B. INACTIVE ☐ C. UNKNOWN

03 YEARS OF OPERATION

1946 (BEGINNING YEAR) | Present (ENDING YEAR) ☐ UNKNOWN

04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED

Contaminants known to be present include arsenic, cadmium, mercury, dioxn, benzene, chloroform, carbon tetrachloride and numerous other volatile organic compounds.
(Attachments A)

05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION

Contamination of soil and groundwater is well documented. Documentation also indicates that there is a potential for contamination of air and surface water. Population may have been exposed via contaminated drinking water and direct contact.
(Attachments A,K,L)

V. PRIORITY ASSESSMENT

01 PRIORITY FOR INSPECTION (Check one. If high or medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Incidents)

☒ A. HIGH (Inspection required promptly) ☐ B. MEDIUM (Inspection required) ☐ C. LOW (Inspect on time available basis) ☐ D. NONE (No further action needed; complete current disposition form)

VI. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)		03 TELEPHONE NUMBER
George Cambell	NJDEP DWR B. Groundwater Quality Mgt.		(609) 292-0424
04 PERSON RESPONSIBLE FOR ASSESSMENT	**05 AGENCY**	**06 ORGANIZATION**	**07 TELEPHONE NUMBER**	**08 DATE**
Robert Raisch	NJDEP	DHWM/BPA	(609) 984-3017	06/30/88 (MONTH DAY YEAR)

EPA FORM 2070-12 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NJ	D002164457

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- [X] A. SOLID
- [X] B. POWDER, FINES
- [ ] C. SLUDGE
- [ ] D. OTHER (Specify)
- [ ] E. SLURRY
- [X] F. LIQUID
- [ ] G. GAS

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)

- TONS: unknown
- CUBIC YARDS: unknown
- NO. OF DRUMS: unknown

03 WASTE CHARACTERISTICS (Check all that apply)

- [X] A. TOXIC
- [ ] B. CORROSIVE
- [ ] C. RADIOACTIVE
- [X] D. PERSISTENT
- [ ] E. SOLUBLE
- [ ] F. INFECTIOUS
- [X] G. FLAMMABLE
- [ ] H. IGNITABLE
- [X] I. HIGHLY VOLATILE
- [ ] J. EXPLOSIVE
- [ ] K. REACTIVE
- [ ] L. INCOMPATIBLE
- [ ] M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE			
OLW	OILY WASTE			Soil and groundwater
SOL	SOLVENTS	unknown		contamination is result
PSD	PESTICIDES	unknown		of unknown quantity of
OCC	OTHER ORGANIC CHEMICALS	unknown		waste into lagoon.
IOC	INORGANIC CHEMICALS			
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS	unknown		

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
SOL	benzene	71-43-2	Groundwater contaminants	820,000	ppb
SOL	carbon tetrachloride	56-23-5	(Highest concents.)	3,400,000	ppb
SOL	chloroform	67-66-3		6,000	ppb
SOL	ethylbenzene	100-41-4		7	ppb
PSD	2,4-D	94-11-1		5,200	ppb
MES	argenic	7440-38-2		3,400	ppb
MES	arsenic	7440-38-2	Soil Contaminants	870,000	ppm
MES	cadmium	7440-42-9	(Highest Concents)	250,000	ppm
MES	mercury	7439-97-6		110,000,000	ppm
PSD	2,3,7,8-TCDD (Dioxin)	1746-01-6		37	ppm

V. FEEDSTOCKS (See Appendix for CAS Numbers)

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Attachment A Hydrogeologic and Soil Investigation, April 1987 NJDEP/DWR/NBF
Attachment G EPA National Dioxin Study Results for W.A. Cleary NJDEP/DWM/BEECRA

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NJ	D002164457

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 X A. GROUNDWATER CONTAMINATION — 02 X OBSERVED (DATE 10/9/83) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED _____ 04 NARRATIVE DESCRIPTION

Numerous samples collected and analyzed during the period of 1981 to 1987, confirm the presence of arsenic, cadmium, mercury, benzene, carbon tetrachloride and pesticides in the groundwater at the site.

(Attachments A,H,I,K,L)

01 X B. SURFACE WATER CONTAMINATION — 02 ☐ OBSERVED (DATE 5/13/81) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED _____ 04 NARRATIVE DESCRIPTION

Surface water samples collected from W.A. Cleary runoff and effluent ditch were found to be contaminated with arsenic, cadmium and mercury.

(Attachment J)

01 X C. CONTAMINATION OF AIR — 02 ☐ OBSERVED (DATE 1981) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED _____ 04 NARRATIVE DESCRIPTION

Documentation indicates that 5.5 pounds of benzene were lost to evaporation per hour during reaction processess used to produce phenylmercuric acetate. (Attachment M)

01 X D. FIRE/EXPLOSIVE CONDITIONS — 02 ☐ OBSERVED (DATE _____) X POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED _____ 04 NARRATIVE DESCRIPTION

There is a potential for fire or explosive conditions to exists due to the nature of materials used in manufacturing processes at the site.

(Attachment A,C)

01 X E. DIRECT CONTACT — 02 ☐ OBSERVED (DATE _____) X POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED _____ 04 NARRATIVE DESCRIPTION

There is a potential for direct contact contaminated soils, contents of lagoons and production areas due to inadequate site security.

(Attachment O)

01 X F. CONTAMINATION OF SOIL — 02 X OBSERVED (DATE 1/31/79) ☐ POTENTIAL ☐ ALLEGED
03 AREA POTENTIALLY AFFECTED _____ Acres 04 NARRATIVE DESCRIPTION

Numerous samples collected and analyzed during the period of 1979 to 1987 confirm that the soil at the site is extensively contaminated with arsenic, cadmium and mercury. (Attachments A,H,I,K,L)

01 X G. DRINKING WATER CONTAMINATION — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL X ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

Sampling of 5 residental wells located near the site in 1981 revealed arsenic concentrations ranging from 2.0 to 9.0 ppb. W.A. Cleary site is suspected source of contamination. (Attachment J)

01 X H. WORKER EXPOSURE/INJURY — 02 X OBSERVED (DATE: 11/1/82) ☐ POTENTIAL ☐ ALLEGED
03 WORKERS POTENTIALLY AFFECTED _____ 04 NARRATIVE DESCRIPTION

A 1982 OSHA report states that workers were exposed to Thiram, an active ingredient in fungicides, when charging reactor vessels.

(Attachment N)

01 X I. POPULATION EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE _____) X POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

Population may have been exposed via contaminated drinking water.

(Attachment J)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NJ	D002164457

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ☒ J DAMAGE TO FLORA — 02 ☐ OBSERVED (DATE _____) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
There is a potential for contaminants and materials on site, which include herbicides, to impact on flora.
(Attachment A)

01 ☒ K DAMAGE TO FAUNA — 02 ☐ OBSERVED (DATE _____) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
There is a potential for contaminants that may reach surface water to impact on Fauna.
(Attachment A)

01 ☒ L CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE _____) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
There is a potential for contamination of the food chain due to the high levels of mercury contamination found at the site.
(Attachment A,C)

01 ☒ M UNSTABLE CONTAINMENT OF WASTES — 02 ☒ OBSERVED (DATE 9/19/80) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED _____ 04 NARRATIVE DESCRIPTION
A DEP-DWR Administrative Consent Order states that the chemical lagoon is undersized and subject to overflowing.
(Attachment H)

01 ☒ N DAMAGE TO OFFSITE PROPERTY — 02 ☐ OBSERVED (DATE _____) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
There is a potential for contaminants found in drainage and effluent ditches on site to migrate offsite.
(Attachments A & L)

01 ☐ O CONTAMINATION OF SEWERS STORM DRAINS WWTPs — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
No evidence was found in the documentation to indicate a potential for contamination of sewers, storm drains or WWTPs.

01 ☒ P ILLEGAL UNAUTHORIZED DUMPING — 02 ☒ OBSERVED (DATE 12/18/1979) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
During a 1979 NJDEP site inspection, several piles of trash used drums from product lines and an oily tarry substance were observed in a wooded area of the property. (Attachment H)

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS
A dioxin study of the site conducted by EPA in 1984 revealed one soil sample that was contaminated with dioxin at a concentration of 35 ppb.
(Attachment G)

III. TOTAL POPULATION POTENTIALLY AFFECTED: _____

IV. COMMENTS

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)
Attachments A,I,J,K & L - NJDEP/DWR/NBFO
Attachment C - NJDEP/DWM/BEERCA
Attachment N - NJDEP/DWM/BPA
Attachment G - NJDEP/BEERA

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION
PART 4 - PERMIT AND DESCRIPTIVE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NJ	D002164457

II. PERMIT INFORMATION

01 TYPE OF PERMIT ISSUED (Check all that apply)	02 PERMIT NUMBER	03 DATE ISSUED	04 EXPIRATION DATE	05 COMMENTS
☐ A. NPDES	NJ0003816	1/30/76		Surface Water Discharge EPA
☐ B. UIC				
☐ C. AIR	35110			2 stacks-one is for boiler
☐ D. RCRA				
☐ E. RCRA INTERIM STATUS				
☐ F. SPCC PLAN				
☐ G. STATE (Specify)				
☐ H. LOCAL (Specify)				
☐ I. OTHER (Specify)				
☐ J. NONE				

III. SITE DESCRIPTION

01 STORAGE/DISPOSAL (Check all that apply)	02 AMOUNT	03 UNIT OF MEASURE
☒ A. SURFACE IMPOUNDMENT	unknown	
☐ B. PILES		
☒ C. DRUMS, ABOVE GROUND	unknown	
☐ D. TANK, ABOVE GROUND		
☐ E. TANK, BELOW GROUND		
☐ F. LANDFILL		
☐ G. LANDFARM		
☐ H. OPEN DUMP		
☐ I. OTHER (Specify)		

04 TREATMENT (Check all that apply)

- ☐ A. INCENERATION
- ☐ B. UNDERGROUND INJECTION
- ☐ C. CHEMICAL/PHYSICAL
- ☐ D. BIOLOGICAL
- ☐ E. WASTE OIL PROCESSING
- ☐ F. SOLVENT RECOVERY
- ☐ G. OTHER RECYCLING/RECOVERY
- ☐ H. OTHER (Specify)

05 OTHER

☐ A. BUILDINGS ON SITE (4)

06 AREA OF SITE

138 Acres

07 COMMENTS

The facility used a approximately 8000 sq. ft. chemical lagoon which was subject to overflowing. During a 1979 NJDEP site inspection, drums were found discarded in a wooded area and also noted to be stored haphazardly in the drum storage area.

(Attachment C,H)

IV. CONTAINMENT

01 CONTAINMENT OF WASTES (Check one)

☐ A. ADEQUATE, SECURE ☐ B. MODERATE ☐ C. INADEQUATE, POOR ☒ D. INSECURE, UNSOUND, DANGEROUS unsound run on diversion

02 DESCRIPTION OF DRUMS, DIKING, LINERS, BARRIERS, ETC

The chemical lagoon had a clay liner but was subject to overflowing allowing soils to become contaminated. During a 1979, NJDEP site inspectio rusted and leaking drums were noted.

(Attachments A,C & H)

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE ☒ YES ☐ NO

02 COMMENTS

Contaminated and production areas are accessible due to inadiquate site security.

VI. SOURCES OF INFORMATION (Cite specific references, e.g. state files, sample analysis, reports)

Attachments A & H - NJDEP/DWR/NBFO
Attachments C NJDEP/DWR/BEERCA

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NJ	D002164457

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY (Check as applicable)	SURFACE	WELL	02 STATUS ENDANGERED	AFFECTED	MONITORED	03 DISTANCE TO SITE
COMMUNITY	A. ☐	B. ☒	A. ☒	B. ☐	C. ☐	A. 3.1 (mi)
NON-COMMUNITY	C. ☐	D. ☒	D. ☒	E. ☐	F. ☐	B. 0.35 (mi)

III. GROUNDWATER

01 GROUNDWATER USE IN VICINITY (Check one)

☐ A. ONLY SOURCE FOR DRINKING ☒ B. DRINKING (Other sources available) COMMERCIAL, INDUSTRIAL IRRIGATION (No other water sources available) ☐ C. COMMERCIAL, INDUSTRIAL, IRRIGATION (Limited other sources available) ☐ D. NOT USED, UNUSEABLE

02 POPULATION SERVED BY GROUND WATER	03 DISTANCE TO NEAREST DRINKING WATER WELL
1273	0.33 (mi)

04 DEPTH TO GROUNDWATER	05 DIRECTION OF GROUNDWATER FLOW	06 DEPTH TO AQUIFER OF CONCERN	07 POTENTIAL YIELD OF AQUIFER	08 SOLE SOURCE AQUIFER
4 (ft)	S. East	18 (ft)	(gpd)	☒ YES ☐ NO

09 DESCRIPTION OF WELLS (Including useage, depth, and location relative to population and buildings)

Groundwater in the site area is used for potable and industrial purposes. Well logs indicate that there are approximately 335 private wells located within 4 miles of the site.

10 RECHARGE AREA		11 DISCHARGE AREA	
☒ YES ☐ NO	COMMENTS: Contamination of shallow and deep aquifers at the site indicate area of recharge.	☐ YES ☒ NO	COMMENTS

IV. SURFACE WATER

01 SURFACE WATER USE (Check one)

☒ A. RESERVOIR, RECREATION, DRINKING WATER SOURCE ☐ B. IRRIGATION, ECONOMICALLY IMPORTANT RESOURCES ☐ C. COMMERCIAL, INDUSTRIAL ☐ D. NOT CURRENTLY USED

02 AFFECTED POTENTIALLY AFFECTED BODIES OF WATER

NAME	AFFECTED	DISTANCE TO SITE
Mile Run, Raritan River	☐	0.25 + 3.0 (mi)
Six Mile Run, Millstone River	☐	0.5 + 4.0 (mi)
	☐	(mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN

ONE (1) MILE OF SITE	TWO (2) MILES OF SITE	~~THREE (3)~~ Four (4) MILES OF SITE
A. Approx. 2500 NO. OF PERSONS	B. NO. OF PERSONS	C. 103000 NO. OF PERSONS

02 DISTANCE TO NEAREST POPULATION: 0.33 (mi)

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE	04 DISTANCE TO NEAREST OFF-SITE BUILDING
Several hundred	0.25 (mi)

05 POPULATION WITHIN VICINITY OF SITE (Provide narrative description of nature of population within vicinity of site, e.g., rural, village, densely populated urban area)

Land use in the vicinity of the site is a mixture residential commerical and light industrial. North and east of the site are more densely populated areas of Sumerset Boro and the City of New Brunswick. Areas south and west of the site, are mostly light industrial becoming rural moving farther from the site. The population within a four mile radius of the site is approximately 103,000.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NJ	D002164457

VI. ENVIRONMENTAL INFORMATION

01 PERMEABILITY OF UNSATURATED ZONE (Check one)

[X] A. 10^{-6} – 10^{-8} cm/sec [ ] B. 10^{-4} – 10^{-6} cm/sec [ ] C. 10^{-4} – 10^{-3} cm/sec [ ] D. GREATER THAN 10^{-3} cm/sec

02 PERMEABILITY OF BEDROCK (Check one)

A. IMPERMEABLE (Less than 10^{-6} cm/sec) [ ] B. RELATIVELY IMPERMEABLE (10^{-4} – 10^{-6} cm/sec) [X] C. RELATIVELY PERMEABLE (10^{-2} – 10^{-4} cm/sec) [ ] D. VERY PERMEABLE (Greater than 10^{-2} cm/sec)

03 DEPTH TO BEDROCK	04 DEPTH OF CONTAMINATED SOIL ZONE	05 SOIL pH	
0 to 10 (ft)	0 to 10 (ft)		

06 NET PRECIPITATION	07 ONE YEAR 24 HOUR RAINFALL	08 SLOPE: SITE SLOPE	DIRECTION OF SITE SLOPE	TERRAIN AVERAGE SLOPE
12 (in)	2.5 (in)	1.0 %	East & West	1.0 %

09 FLOOD POTENTIAL

SITE IS IN NA YEAR FLOODPLAIN

10

[ ] SITE IS ON BARRIER ISLAND, COASTAL HIGH HAZARD AREA, RIVERINE FLOODWAY

NA

11 DISTANCE TO WETLANDS (5 acre minimum)

ESTUARINE

A NONE (mi)

OTHER freshwater marsh

B Approx. 1.5 (mi)

12 DISTANCE TO CRITICAL HABITAT (of endangered species)

_____ (mi) NONE

ENDANGERED SPECIES: _____

13 LAND USE IN VICINITY

DISTANCE TO:

COMMERCIAL INDUSTRIAL	RESIDENTIAL AREAS; NATIONAL STATE PARKS, FORESTS OR WILDLIFE RESERVES	AGRICULTURAL LANDS: PRIME AG LAND	AG LAND
A 0.25 (mi)	B 0.33 (mi)	C NONE (mi)	Approx. 1.5 (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

The approximately 136-acre site in Franklin Township is bordered on the southeast by Route 27, on the north by the NJ R.R., on the north and west by woods and on the south by a commercial property. About 8 acres in the southwest portion of the site are used for the manufacturing facility. The remainder of the site is developed as the Tara Greens Golf Course.

The site is located on a divide between land that drains toward Mile Run and land that drains toward a tributary of Six Mile Run. Site elevations range from approximately 120 to 130 MSL.

VII. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

NJDEP/DWR Water Allocation & Well Logs
Attachment B - NJDEP/DWM/BEERCA

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 6 - SAMPLE AND FIELD INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NJ	D002164457

II. SAMPLES TAKEN

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER	27	S-R Analytical Cherry Hill, NJ	1987
SURFACE WATER	3	NJ Dept. of Health Lab.	1981
WASTE			
AIR			
RUNOFF			
SPILL			
SOIL	120	S-R Analytical Cherry Hill, NJ	1987
VEGETATION			
OTHER			

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS

IV. PHOTOGRAPHS AND MAPS

01 TYPE ☐ GROUND ☐ AERIAL

02 IN CUSTODY OF _____ (Name of organization or individual)

03 MAPS ☑ YES ☐ NO

04 LOCATION OF MAPS: NJDEP-Bureau of Groundwater Quality Management

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

VI. SOURCES OF INFORMATION (Cite specific references, e.g. state files, sample analysis, reports)

Attachments A,C, & J NJDEP/DWR/NBFO
Attachment B NJDEP/DWM/BEERCA

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 7 - OWNER INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NJ	D002164457

II. CURRENT OWNER(S)

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE
W.A. Cleary	00-216-4457	P.O. Box 10	2075	Somerset	NJ	08873

PARENT COMPANY (if applicable)

08 NAME	09 D+B NUMBER	10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE	12 CITY	13 STATE	14 ZIP CODE

III. PREVIOUS OWNER(S) (list most recent first)

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE

IV. REALTY OWNER(S) (if applicable, list most recent first)

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

NJDEP Information Resource Center

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 8 - OPERATOR INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NJ	D002164457

II. CURRENT OPERATOR (Provide if different from owner)

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER

OPERATOR'S PARENT COMPANY (If applicable)

10 NAME	11 D+B NUMBER

12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

14 CITY	15 STATE	16 ZIP CODE

III. PREVIOUS OPERATOR(S) (List most recent first; provide only if different from owner)

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD

PREVIOUS OPERATORS' PARENT COMPANIES (If applicable)

10 NAME	11 D+B NUMBER

12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

14 CITY	15 STATE	16 ZIP CODE

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD

10 NAME	11 D+B NUMBER

12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

14 CITY	15 STATE	16 ZIP CODE

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD

10 NAME	11 D+B NUMBER

12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

14 CITY	15 STATE	16 ZIP CODE

IV. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

NJDEP Information Resource Center

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 9 - GENERATOR/TRANSPORTER INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NJ	D002164457

II. ON-SITE GENERATOR

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

III. OFF-SITE GENERATOR(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
NA			
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE
01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE

IV. TRANSPORTER(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
NA			
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE
01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NJ	D002164457

II. PAST RESPONSE ACTIVITIES

01 ☐ A. WATER SUPPLY CLOSED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
NONE

01 ☐ B. TEMPORARY WATER SUPPLY PROVIDED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
NONE

01 ☐ C. PERMANENT WATER SUPPLY PROVIDED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
NONE

01 ☐ D. SPILLED MATERIAL REMOVED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
NONE

01 ☐ E. CONTAMINATED SOIL REMOVED — 02 DATE 1987 — 03 AGENCY ~~NJDEP/DWR~~
04 DESCRIPTION Contaminated soil down to a depth of one foot has been removed from an approximate area of three acres.

01 ☐ F. WASTE REPACKAGED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
NONE

01 ☐ G. WASTE DISPOSED ELSEWHERE — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
NONE

01 ☐ H. ON SITE BURIAL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
NONE

01 ☐ I. IN SITU CHEMICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
NONE

01 ☐ J. IN SITU BIOLOGICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
NONE

01 ☐ K. IN SITU PHYSICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
NONE

01 ☐ L. ENCAPSULATION — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
NONE

01 ☐ M. EMERGENCY WASTE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
NONE

01 ☐ N. CUTOFF WALLS — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
NONE

01 ☐ O. EMERGENCY DIKING/SURFACE WATER DIVERSION — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
NONE

01 ☐ P. CUTOFF TRENCHES/SUMP — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
NONE

01 ☐ Q. SUBSURFACE CUTOFF WALL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
NONE

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NJ	D002164457

II PAST RESPONSE ACTIVITIES Continued

01 ☐ R. BARRIER WALLS CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
NONE

01 ☐ S. CAPPING COVERING — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
NONE

01 ☐ T. BULK TANKAGE REPAIRED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
NONE

01 ☐ U. GROUT CURTAIN CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
NONE

01 ☐ V. BOTTOM SEALED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
NONE

01 ☐ W. GAS CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
NONE

01 ☐ X. FIRE CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
NONE

01 ☐ Y. LEACHATE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
NONE

01 ☐ Z. AREA EVACUATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
NONE

01 ☐ 1. ACCESS TO SITE RESTRICTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
NONE

01 ☐ 2. POPULATION RELOCATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
NONE

01 ☐ 3. OTHER REMEDIAL ACTIVITIES — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
NONE

III. SOURCES OF INFORMATION *(Cite specific references, e.g. state files, sample analysis, reports)*

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 11 - ENFORCEMENT INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NJ	D002164457

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY/ENFORCEMENT ACTION ☒ YES ☐ NO

02 DESCRIPTION OF FEDERAL, STATE, LOCAL REGULATORY/ENFORCEMENT ACTION

In accordance to a NJDEP/Division of Water Resources Consent signed in 1982, an extensive soil and groundwater remedial investigation program and site cleanup was implemented by W.A. Cleary and continues at this time. To date, in addition to soil and groundwater sampling, all wastewater, sludge and th clay lining from the chemical lagoon have been removed from the site. Contaminated soil down to a depth of one foot has also been removed from an approximately three acre area around the lagoon and still. The lead agencies for the site have been the NJDEP Division of Water Resources, Bureau of Ground Water Quality Management and the NJDEP DWR Northern Regional Enforcement Office. At the time of this writing, W.A. Cleary has also come under the jurisdiction of ECRA due to the intended sale of part of the site property.

III. SOURCES OF INFORMATION *(Cite specific references, e.g., state files, sample analysis, reports)*

Attachments A,E & H NJDEP/DWR/NBF0

EPA FORM 2070-13 (7-81)

WA Cleary
Assigned 11/20/87
On Hold 12/15/87
Restarted 4/21/88

BUREAU OF PLANNING AND ASSESSMENT
FILE/DATA CHECK SHEET
Developed by NJDEP DHWM/BPA 1/14/1988

Agency	Phone No.	Contact	Date	File Y/N	Reviewed
N. J. DEP Div. Water Resources					
A. Central File	(609)292-0400		11/30/87	Y	Y
B. Regional Enforcement Office.	201-299-7592	Mary Fletcher	11/30/87 5/10/88	Y	Y
C. Geological Survey	(609)292-0668		11/30/87	n	n
D. Water Allocation (well logs) (radius program)	(609)984-6831 (609)292-2957	Susan Seer			✓ ✓
E. Groundwater Quality Mgt.	(609)292-0424	~~[illegible]~~ George Cambell	12/3/87 ~~5/10/88~~	Y	Y
F. Indust. Waste Mgt. (NJPDES permits)	(609)292-4860				
G. Other	____________				
Div. Waste Management					
A. Regional Enforcement Office	201-299-7570	Inactive File	6/8/88	Y	Y
B. Case Management	(609)633-0701				
C. ECRA	(609)633-7141	Liz Matiset	7/18/88 ~~[illegible]~~	yes ~~A~~	yes ~~A~~
D. Haz. Waste Eng.	(609)292-9880				
E. Other	____________				
Div. Env. Quality		(2 stacks 880582 Perm [illegible] 81749 [illegible])			(no yet)
A. Reg. Air Pollution Control Office	201-299-7700	John Walsh	5/2/88	Y	
B. Office of Quality Assurance	(609)292-3950				
C. Other B. Pesticide Control	(609) ~~530-4123~~ 530-4139	John Pitonyak	4/29/88	Y	Y
Div. Solid Waste Mgt.					
A. File Room	(609)292-0112				
B. Enforcement Office	(609)426-0791				
C. Solid Waste Eng.	(609)292-7875				

Agency	Phone No.	Contact	Date	File Y/N Reviewed	
Div. Hazardous Site Mitigation					
A. Central File	(609)292-3209				
B. B.of Env.Evaluation and Risk Assmnt.	(609)633-6801 3-1353	Anne Leccio Vincent DiGrigorio	7/18/88	?	no - d-p. of ECRA
C. Site Management	(609)984-2900				
D. Other	____________				
Other N.J.DEP					
A. ORS (DEP Attorneys)	(609)292-5697				
B. Div.of Law (Att.Gen.Office)	(609)984-3900				
C. Office of Science and Research	(609)984-6070				
D. Div.of Fish & Game	____________				
E. Right to Know	(609)292-6714				
F. Off.of Env.Anal. (aerial photos)	(609)292-8206				
F. Other	____________				
N.J. Dept.of Health	609 984-3400	Pani Efron Wholesale Food	7/18/88	yes	no - verbal status
N.J. State Library	(609)292-6220				
U.S.EPA					
A. Surveilance and Monitoring Branch	(201)321-6686				
B. Response and Prevention Branch	(201)321-6658				
C. Other	____________				
Local Authorities					
A. Health Officer	(201) 873-2500	Vincent Agiuho	11/30 5/10/88		
B. Tax Assessor or Town Clerk	____________				
C. Other (Fire,Police, Public Works,etc..)	____________				
Other Agency	____________				

W.A. CLEARY CHEMICAL CORPORATION
ATTACHMENTS

MAPS

1. SITE LOCATION USGS
2. SITE LOCATION COUNTY STREET AND ROAD MAP
3. SITE LOCATION TAX MAP
4. SITE MAP
5. NJ ATLAS BASE MAP
6. NJ ATLAS GEOLOGIC OVERLAY
7. NJ ATLAS WATER SUPPLY OVERLAY
8. NJ ATLAS DRAINAGE BASIN OVERLAY
9. NJDEP/DWR WATER WITHDRAWAL POINT MAP

ATTACHMENTS

A. HYDROGEOLOGIC AND SOILS INVESTIGATION
DAN RAVIV ASSOCIATES INC., APRIL 1987

B. HYDROGELOGIC AND GROUNDWATER CONTAINMENT CONDITIONS AND
CONCEPTUAL GROUND-WATER REMEDIATION PLAN JULY 11, 1988

C. W.A. CLEARY LETTER TO NJDEP NOV. 2, 1987
SUBJECT: GENERAL SITE INFORMATION AND HISTORY
ADDITIONAL SAMPLING LOCATIONS

D. LETTER FROM DAN RAVIV ASSOC. TO NJDEP DEC. 15, 1987
SUBJECT: PROPOSED SOIL CLEANUP PLAN FOR W.A. CLEARY

E. W.A. CLEARY LETTER TO NJDEP JAN. 20, 1987
SUBJECT: SITE CLEANUP OFF-SITE DISPOSAL SITES

F. NJDEP ECRA SITE INSPECTION REPORT

G. EPA NATIONAL DIOXIN STUDY RESULTS FOR W.A. CLEARY

H. NJDEP - W.A. CLEARY ADMINISTRATIVE CONSENT ORDER
SEPT. 28, 1982

I. NJDEP LETTER TO W.A. CLEARY JAN. 23, 1986
SUBJECT: NJPDES PERMIT

J. SAMPLING RESULTS: W.A. CLEARY LAGOONS, PRODUCTION WELLS AND LOCAL
PRIVATE DOMESTIC WELLS MAY 13, 1981

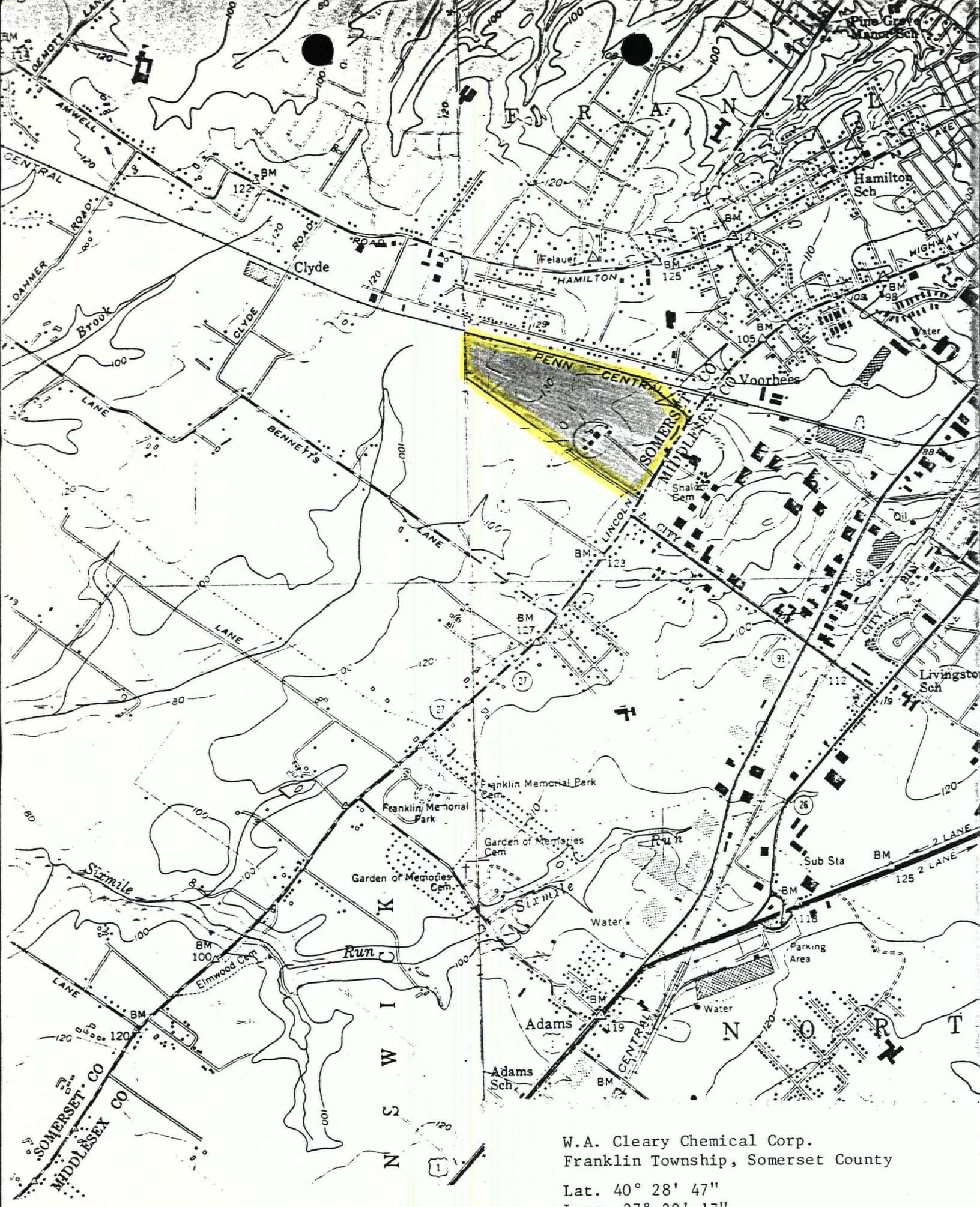
K. SAMPLING RESULTS: MONITORING WELLS APRIL 13, 1983

L. SAMPLING RESULTS: CLEARY ABANDONED WELL AND SELECTED SITES
5/31/83

M. W.A. CLEARY LETTERS TO NJDEP MAY 14, 1981 AND NOV. 6, 1981
SUBJECT: AIR POLLUTION

N. OSHA REPORT 9/22/82

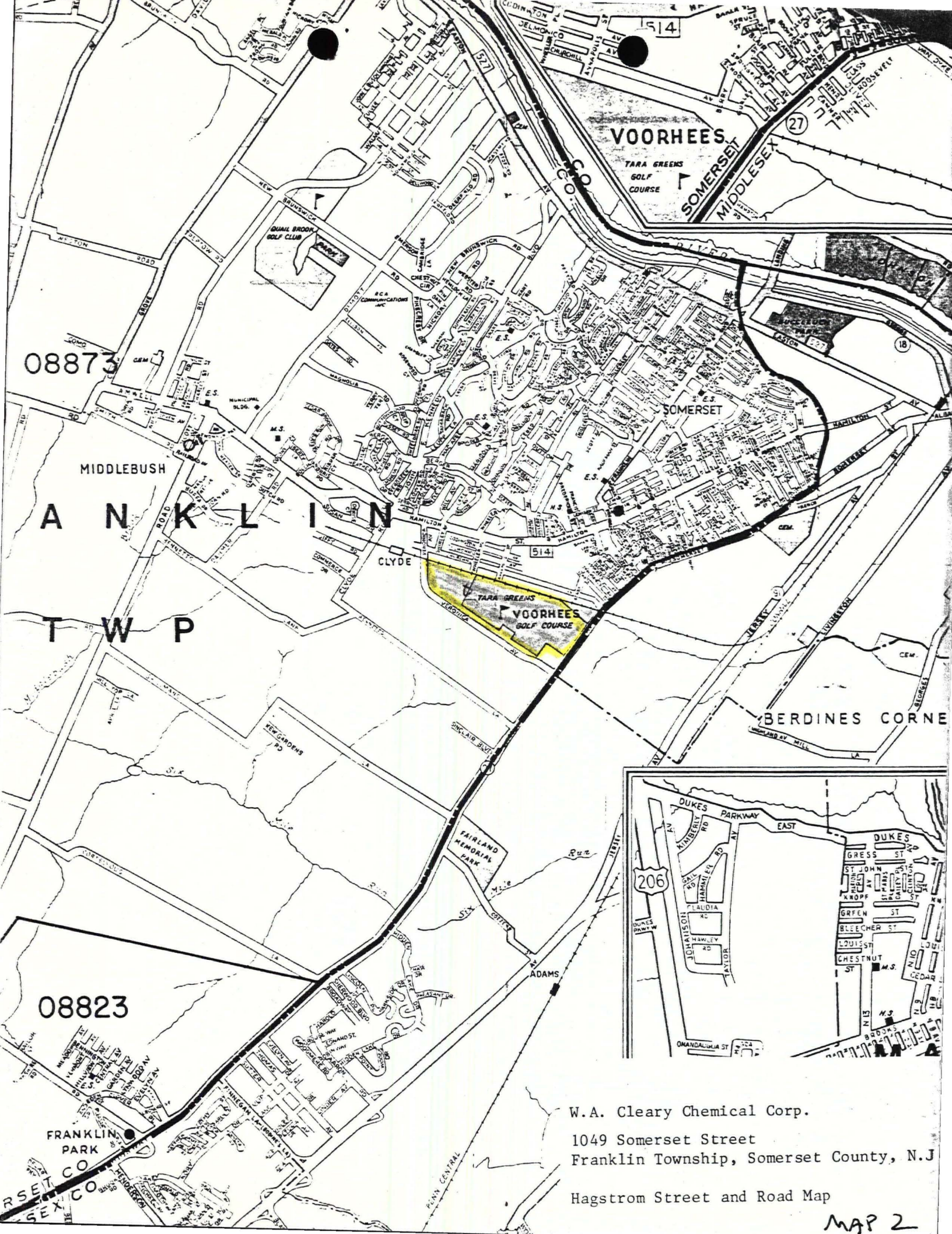
O. MEMO TO FILE - SUBJECT: WINDSHIELD SURVEY



W.A. Cleary Chemical Corp.
Franklin Township, Somerset County

Lat. 40° 28' 47"
Long. 27° 29' 17"
USGS Monmouth Juct. and New Bruns. quad.

MAP 1

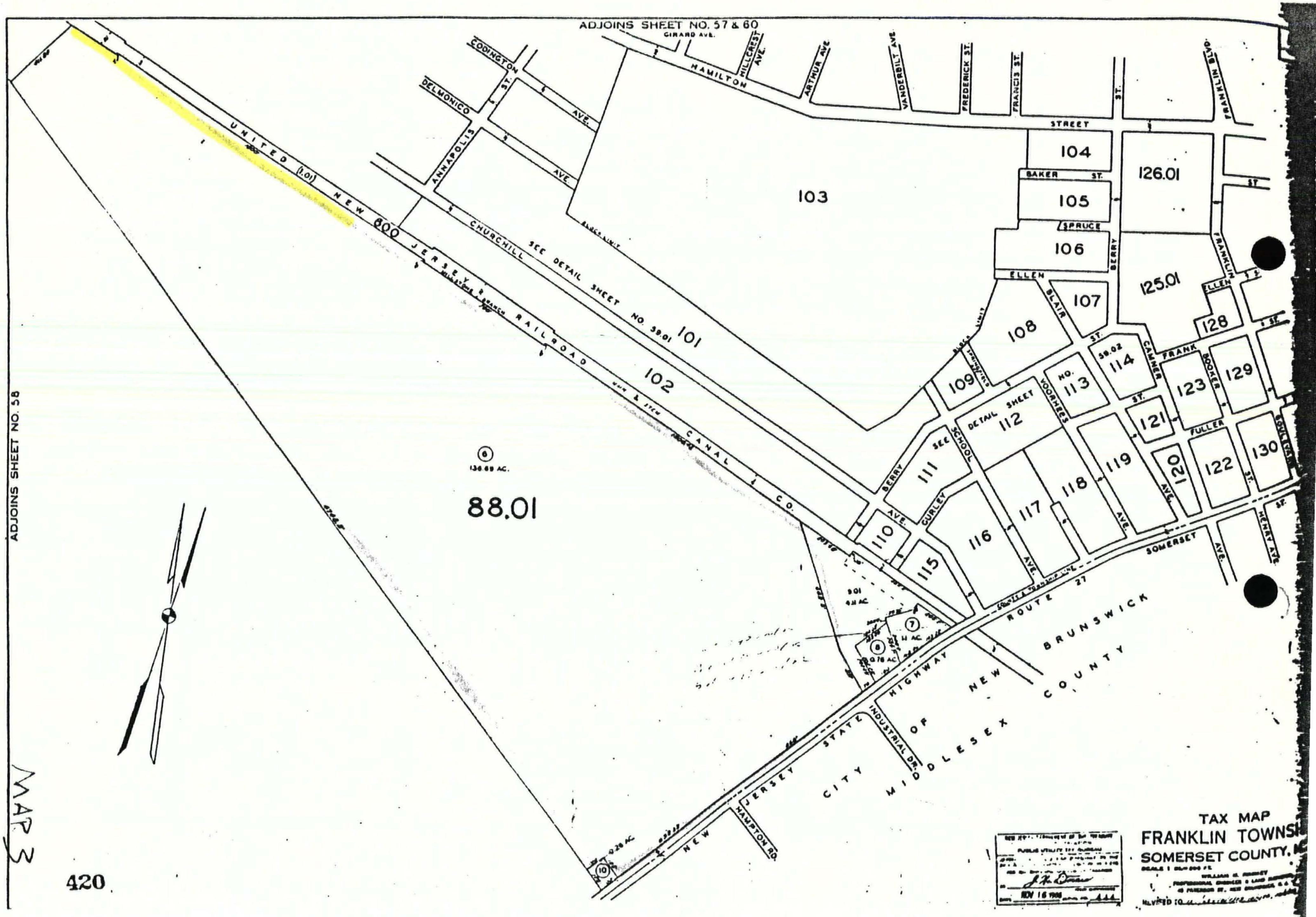


W.A. Cleary Chemical Corp.

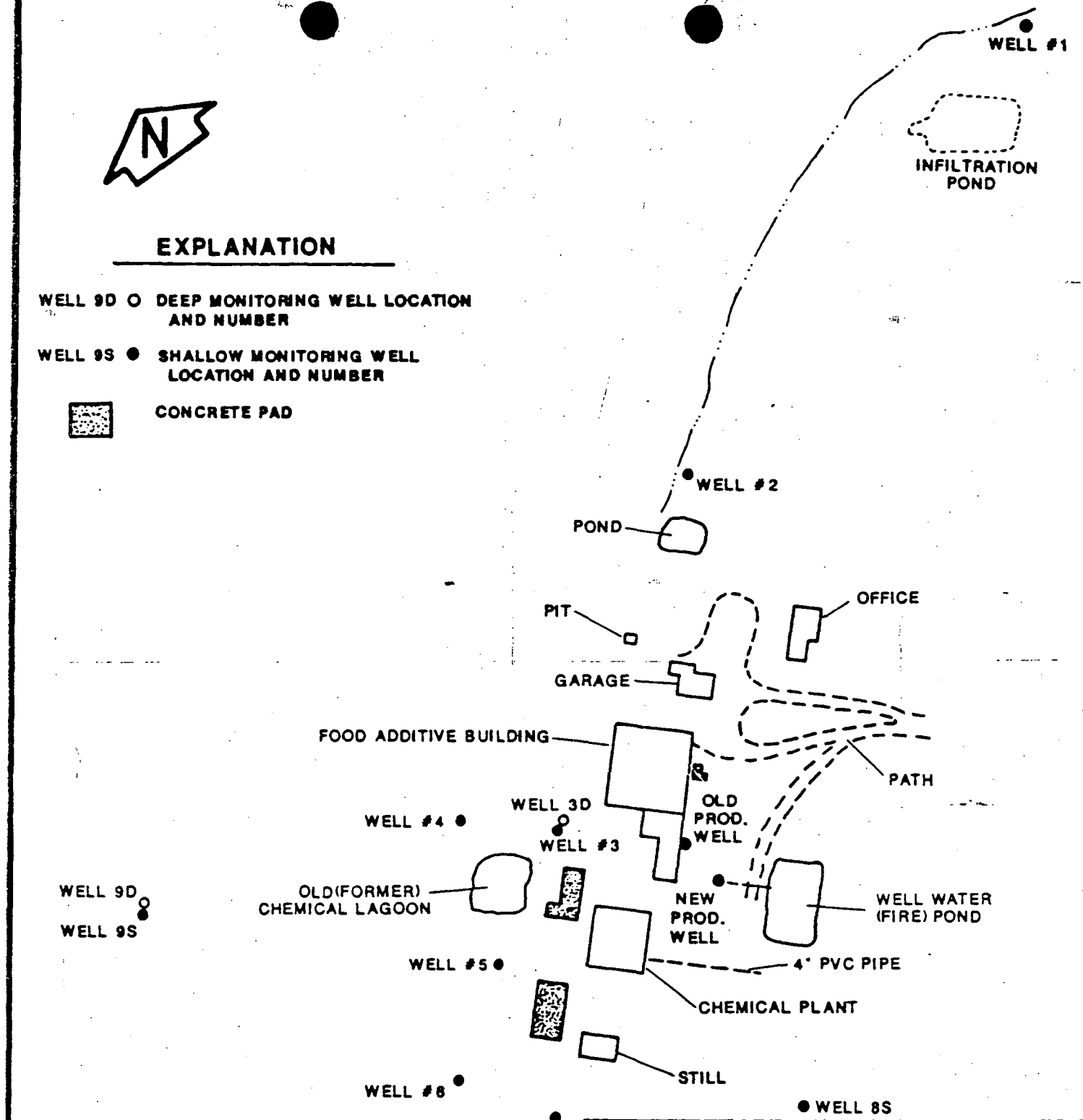
1049 Somerset Street
Franklin Township, Somerset County, N.J

Hagstrom Street and Road Map

MAP 2



ADJOINS SHEET NO. 57 & 60
GIRARD AVE.
HAMILTON
HILLCREST AVE.
ARTHUR AVE
VANDERBILT AVE.
FREDERICK ST.
FRANCIS ST.
FRANKLIN BLVD.
STREET
ST.
CODINGTON AVE.
DELMONICO
ANNAPOLIS ST.
AVE.
CHURCHILL
SEE DETAIL SHEET NO. 39.01
UNITED (1.01) NEW JERSEY RAILROAD
800
CANAL CO.
104
BAKER ST.
105
SPRUCE
106
ELLEN
BERRY
126.01
125.01
FRANKLIN
103
107
108
BLAIR ST.
101
102
109
110
111
112
113
114
115
116
117
118
119
120
121
122
123
128
129
130
SEE DETAIL SHEET NO. 39.02
VOORHEES AVE.
SCHOOL
GURLEY
BERRY AVE.
CAMMER AVE.
FRANK
BOOKER
FULLER
HENRY AVE.
SOMERSET ST.
ST.
AVE.
6
136.89 AC.
88.01
9.01
7
8
10
0.28 AC.
NEW JERSEY STATE HIGHWAY ROUTE 27
CITY OF NEW BRUNSWICK
MIDDLESEX COUNTY
INDUSTRIAL DR.
HAMPTON RD.
ADJOINS SHEET NO. 58
MAP 3
420
TAX MAP
FRANKLIN TOWNS
SOMERSET COUNTY,
NOV 16 1966



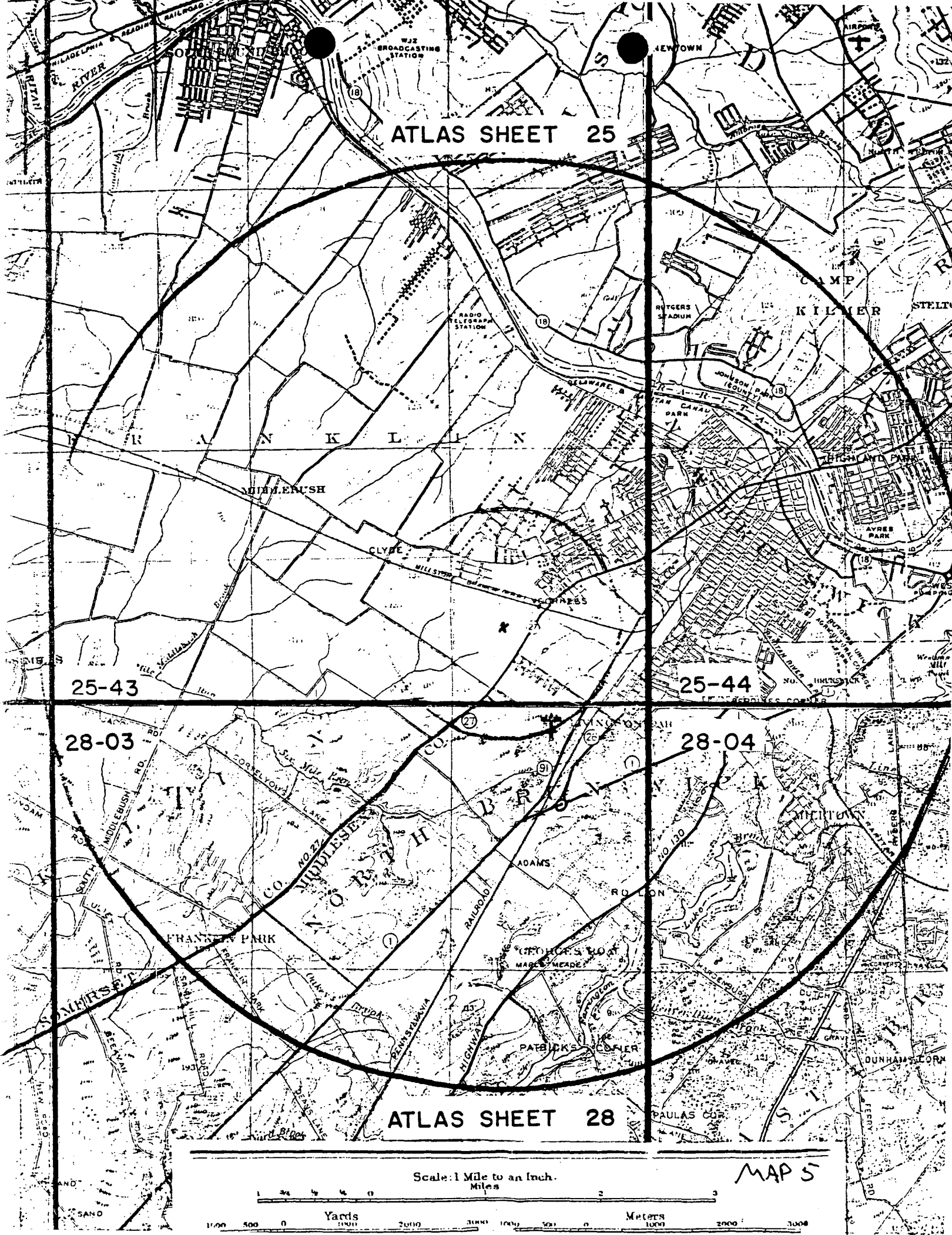
Dan Raviv Associates, Inc.
5 Central Avenue, West Orange, NJ 07052

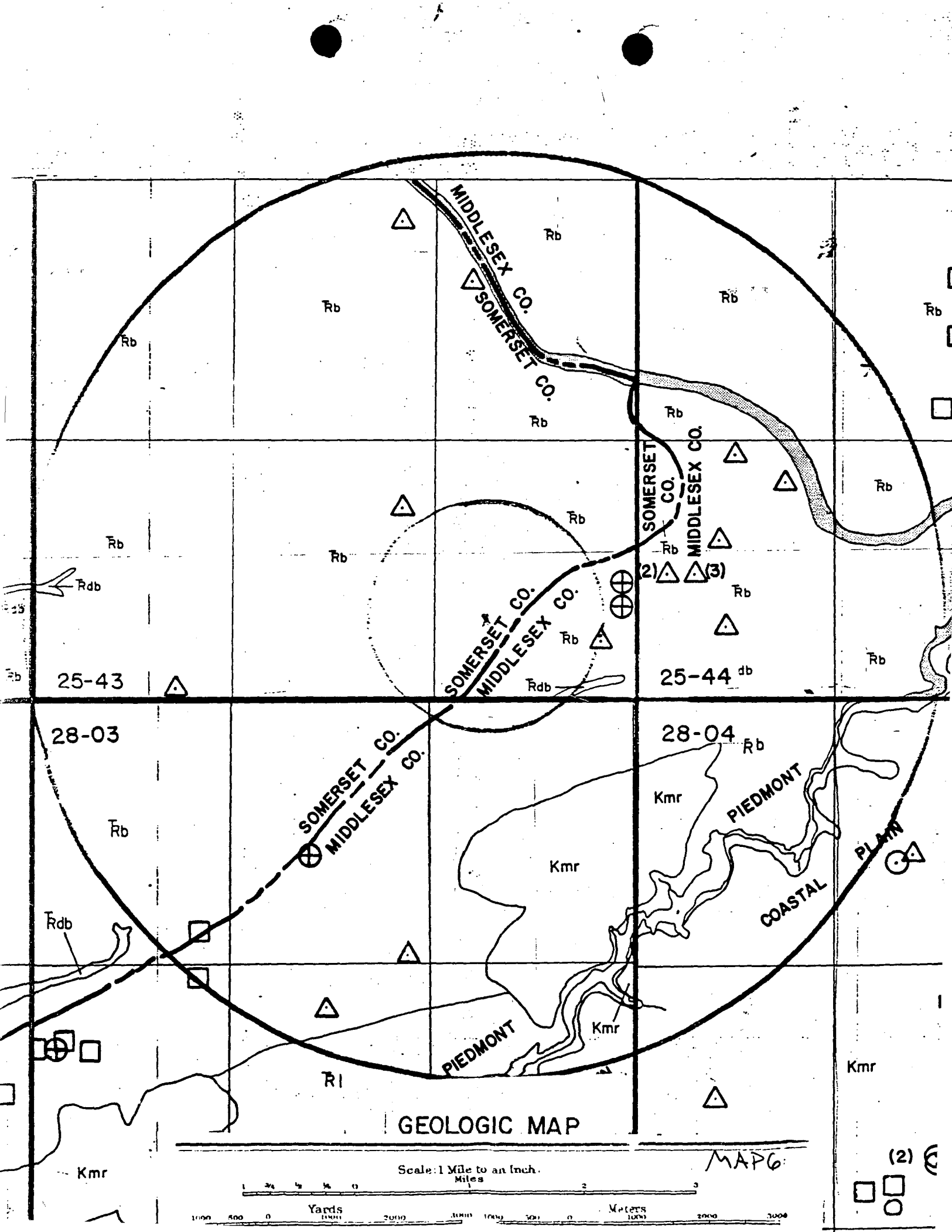
MONITORING WELL LOCATIONS

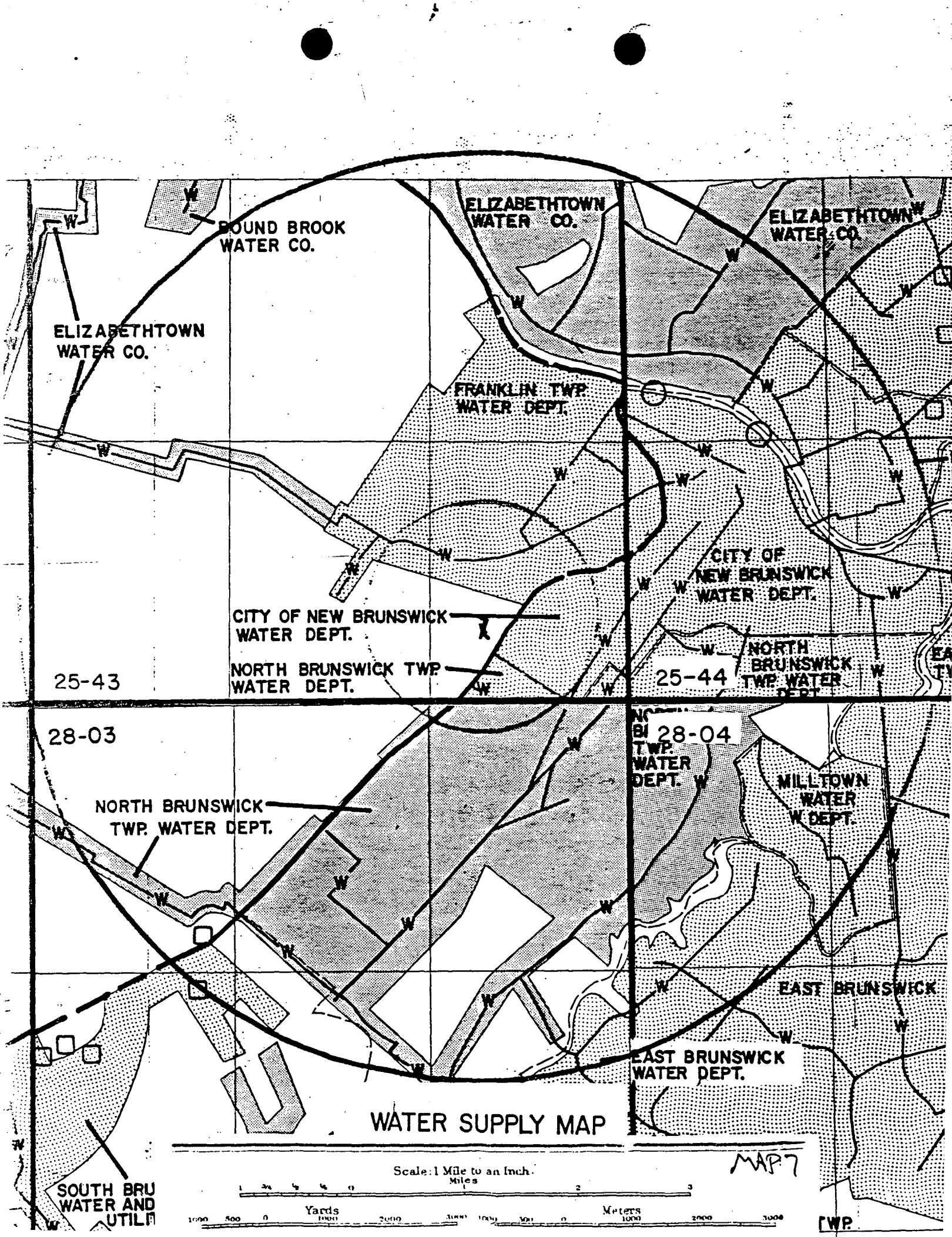
W.A. CLEARY CHEM. CO. - SOMERSET, NJ.

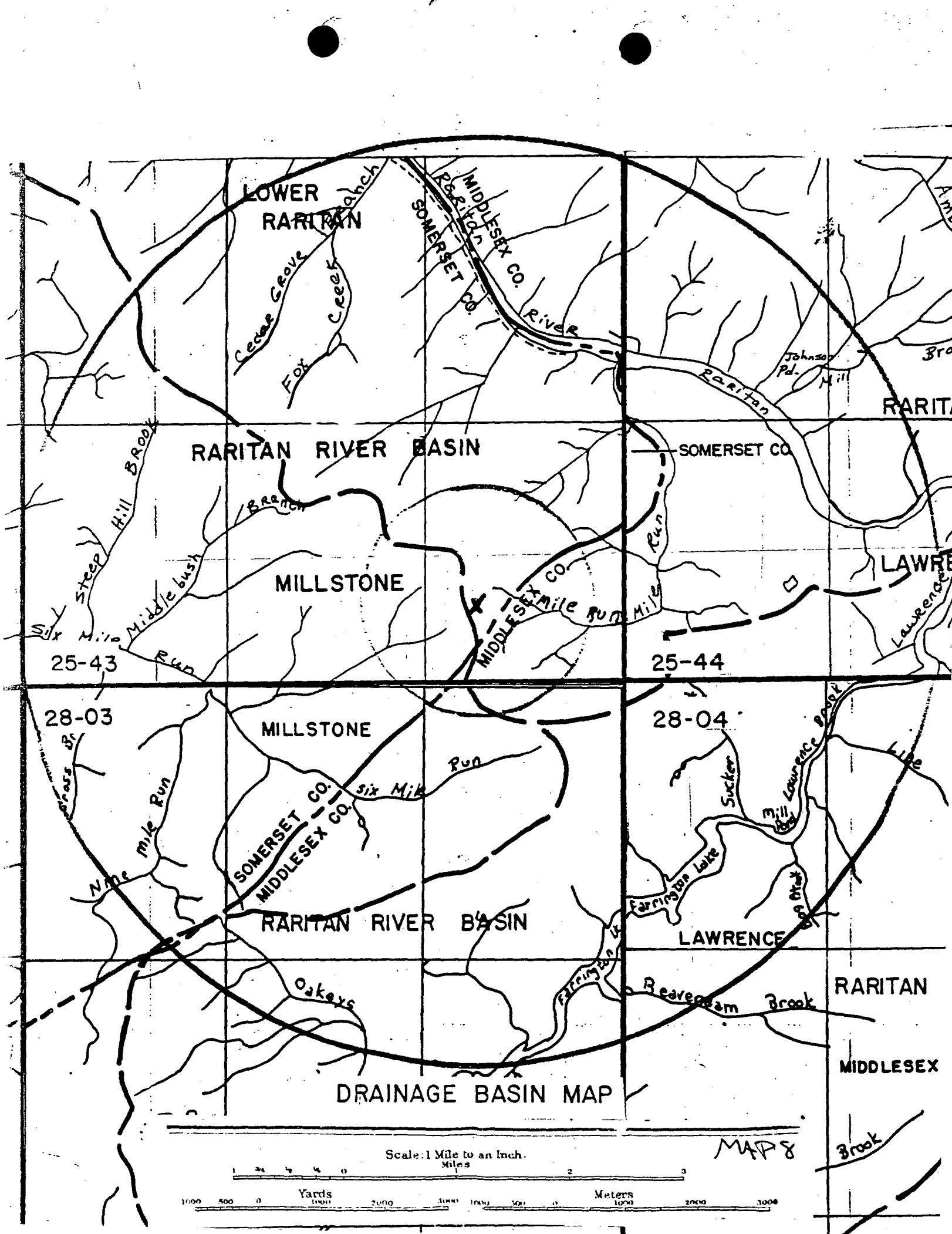
Prepared By EPR/JAL	Date DECEMBER 1986
Job No 86C366	Figure 2

MAP 4


ATLAS SHEET 25
ATLAS SHEET 28
25-43
25-44
28-03
28-04
FRANKLIN
NORTH BRUNSWICK
MIDDLESEX CO.
SOMERSET CO.
MIDDLEBUSH
CLYDE
ADAMS
FRANKLIN PARK
PATRICKS CORNER
HIGHLAND PARK
KILMER
CAMP
Scale: 1 Mile to an Inch.
Miles
Yards
Meters
MAP 5


MIDDLESEX CO.
SOMERSET CO.
SOMERSET CO.
MIDDLESEX CO.
SOMERSET CO.
MIDDLESEX CO.
SOMERSET CO.
MIDDLESEX CO.
Rb
Rdb
Rl
Kmr
25-43
25-44 db
28-03
28-04
(2)
(3)
PIEDMONT
COASTAL PLAIN
PIEDMONT
GEOLOGIC MAP
Scale: 1 Mile to an Inch.
Miles
Yards
Meters
MAP 6
(2)


BOUND BROOK WATER CO.
ELIZABETHTOWN WATER CO.
ELIZABETHTOWN WATER CO.
ELIZABETHTOWN WATER CO.
FRANKLIN TWP. WATER DEPT.
CITY OF NEW BRUNSWICK WATER DEPT.
CITY OF NEW BRUNSWICK WATER DEPT.
NORTH BRUNSWICK TWP. WATER DEPT.
25-43
25-44
NORTH BRUNSWICK TWP. WATER DEPT.
28-03
28-04
NORTH BRUNSWICK TWP. WATER DEPT.
MILLTOWN WATER DEPT.
EAST BRUNSWICK
EAST BRUNSWICK WATER DEPT.
SOUTH BRU WATER AND UTIL
WATER SUPPLY MAP
MAP 7
Scale: 1 Mile to an Inch.
Miles
Yards
Meters
TWP.


LOWER RARITAN
Cedar Grove Brook
Fox Creek
SOMERSET CO.
MIDDLESEX CO.
Raritan River
Johnson Pd. Mill
RARITAN RIVER BASIN
SOMERSET CO.
Steep Hill Brook
Middle bush Brook
Six Mile Run
MILLSTONE
MIDDLESEX CO.
Mile Run
Run
LAWRE
Lawrence
25-43
25-44
28-03
28-04
MILLSTONE
Nine mile Run
SOMERSET CO.
MIDDLESEX CO.
Six Mile Run
Sucker
Lawrence Brook
Mill
Farrington Lake
RARITAN RIVER BASIN
LAWRENCE
Oakeys
Farrington
Beaverdam Brook
RARITAN
MIDDLESEX
Brook
DRAINAGE BASIN MAP
MAP 8
Scale: 1 Mile to an Inch.
Miles
Yards
Meters

LEGEND FOR ATLAS SHEET 25 (GEOLOGY)

△ — INDUSTRIAL WELL YIELD OVER 70 GALLONS PER MINUTE (INCLUDING PRIVATE WELLS)

□ — PUBLIC SUPPLY WELL YIELDING OVER 70 GALLONS PER MINUTE

⊕ — UNSUCCESSFUL ROCK WELL YIELDING LESS THAN 70 GALLONS PER MINUTE

⊙ — UNSUCCESSFUL SAND WELL YIELDING LESS THAN 70 GALLONS PER MINUTE

⊡ — NO TEST – NO DATA ON YIELD

——— FAULT (DASHED WHERE INFERRED)

——— CONTACT (DASHED WHERE INFERRED)

PHYSIOGRAPHIC PROVINCE BOUNDARY

WATER SUPPLY TRANSMISSION LINE

NOTE: WHERE THE PRECAMBRIAN FORMATION BOUNDARIES TERMINATE ABRUPTLY, IT IS THE GEOLOGIST'S OPINION THAT THE GEOLOGICAL COMPLEXITY OF THE AREA PREVENTS FURTHER INTERPRETATIONS.

Kmr — CRETACEOUS MAGOTHY AND RARITAN FORMATIONS (SAND AND CLAY)

Trb — TRIASSIC BRUNSWICK FORMATION

Trc — TRIASSIC CONGLOMERATE BEDS OF THE STOCKTON FORMATION

Trl — TRIASSIC LOCKATONG FORMATION

Trdb — TRIASSIC DIABASE

Trbs — TRIASSIC BASALT FLOWS

Sd — SILURIAN DECKER LIMESTONE AND LONGWOOD SHALE FORMATIONS

Sgp — SILURIAN GREEN POND CONGLOMERATE

Omb — ORDOVICIAN MARTINSBURG SHALE

COk — CAMBRO ORDOVICIAN KITTATINNY LIMESTONE

Ch — CAMBRIAN HARDYSTON SANDSTONE

PRECAMBRIAN:

gh - HORNBLENDE GRANITE WITH PYROXENE GRANITE

ga - ALASKITE

am - AMPHIBOLITE

px - PYROXENE GNEISS

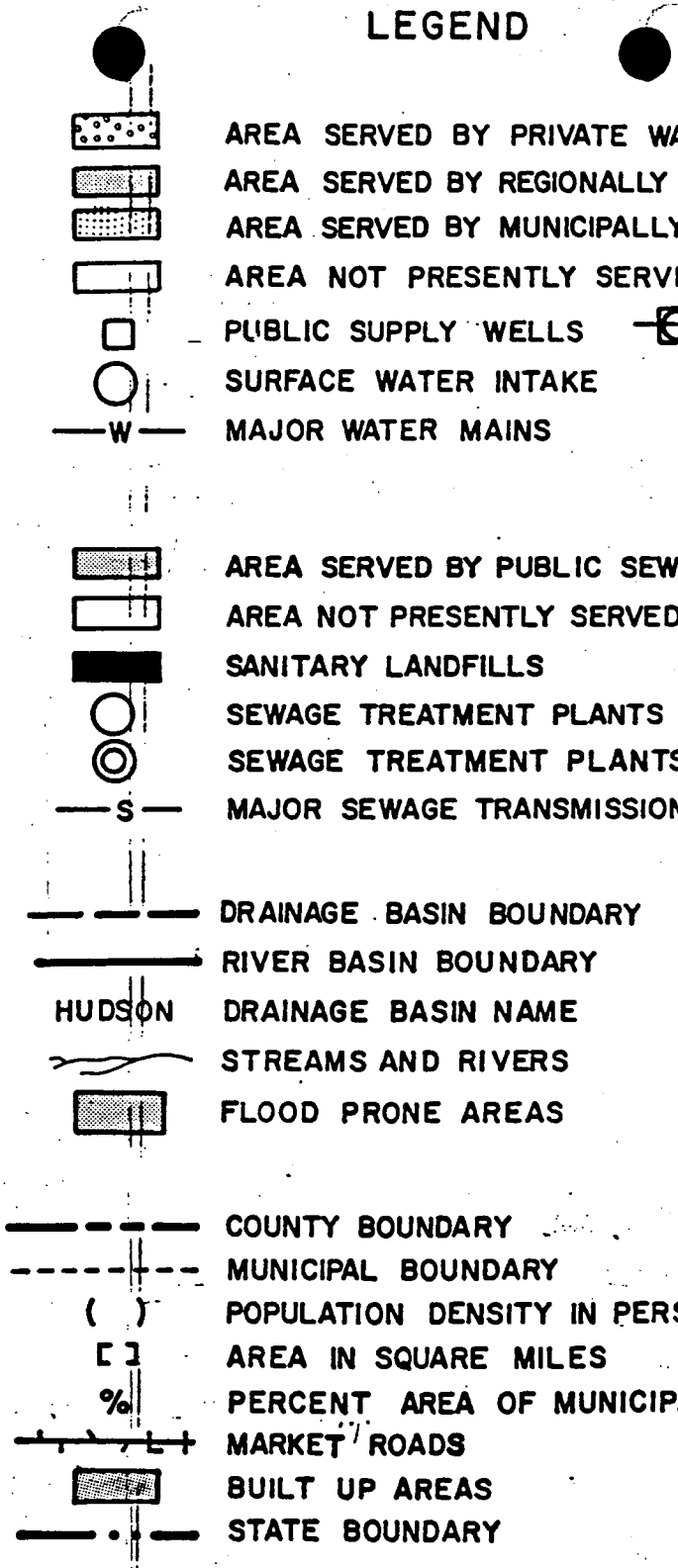
gnq - QUARTZ PLAGIOCLASE GNEISS

gnb - BIOTITE GNEISS

sk - SKARN, GRAPHITE SCHIST

fnd — FORMATION NOT DETERMINED

LEGEND


AREA SERVED BY PRIVATE WATER SERVICE COMPANIES
AREA SERVED BY REGIONALLY OWNED WATER SERVICE COMPANIES
AREA SERVED BY MUNICIPALLY OWNED WATER SERVICE COMPANIES
WATER SUPPLY
AREA NOT PRESENTLY SERVED BY WATER SERVICE
PUBLIC SUPPLY WELLS
WATER MAIN ACROSS HIGHWAY FOR FUTURE USE
SURFACE WATER INTAKE
W
MAJOR WATER MAINS
AREA SERVED BY PUBLIC SEWAGE SERVICE
AREA NOT PRESENTLY SERVED BY SEWAGE SERVICE
SANITARY LANDFILLS
SEWAGE, LANDFILL
SEWAGE TREATMENT PLANTS (CAPACITY <0.3mgd)
SEWAGE TREATMENT PLANTS (CAPACITY ≥0.3mgd)
S
MAJOR SEWAGE TRANSMISSION LINES
DRAINAGE BASIN BOUNDARY
RIVER BASIN BOUNDARY
DRAINAGE BASIN
HUDSON
DRAINAGE BASIN NAME
STREAMS AND RIVERS
FLOOD PRONE AREAS
COUNTY BOUNDARY
MUNICIPAL BOUNDARY
( )
POPULATION DENSITY IN PERSONS PER SQUARE MILE
POPULATION
[ ]
AREA IN SQUARE MILES
%
PERCENT AREA OF MUNICIPALITY ON BLOCK
MARKET ROADS
BUILT UP AREAS
STATE BOUNDARY

BLOCK #25-42

A. Bound Brook, Monmouth Junction, Raritan, Rocky Hill

B. Raritan-Lower Raritan, Millstone, South Branch

C. 1. Blackwells Mills - Non-recording precipitation gauge

2.

Map No.	Location	Period of Record
97	Millstone River near Blackwells Mills	1903-1904,1921-
98	Royce Brook Tributary at Frankfort	1968-
99	Royce Brook Tributary near Belle Mead	1966-

3. 97 Millstone River near Blackwells Mills 1964

Water Quality Standards: (explained in Atlas Sheet description)
FW2 except where classified FW3

D. Brunswick Formation (Trb), Diabase (Trdb)

E. 1. Physiographic Province: Piedmont
Subdivision: Triassic Lowlands
Major Topographic Features: Red Sandstone Plain
Elevations (ft.above sea level): ridges 120, valleys 50
Relief (ft.): 70

2. a. Normal Year: 45"
Dry Year: 33"
Wet Year: 52"

b. January: 30°F
July: 74°F

c. 238 days. Last killing frost: 4/25; first killing frost: 10/15

F. Div. of Parks and Forestry:
Millstone River
Div. of Water Resources:
Delaware and Raritan Canal
Six Mile Run Reservoir
Somerset County:
Colonial Park
Spooky Brook Golf Course

G. U.S.General Services Administration:
Belle Mead Depot

I. Water Well Records

Location	Owner	Year Drilled	Screen Setting or Depth of Casing	Total Depth	g/m Yield	Formation
25-42-124	American Vitrified Prods.	1959	42	290	106	Trb
25-42-126	Gustav Inhauser	1967	60	200	70	"
25-42-129	Cunningham-Limp Co.	1961	30	250	200	"
25-42-186	Hillsborough Water Co.	1957	32	300	201	"
25-42-186	"	1957	33	325	212	"
25-42-345	Belle Mead Development Corp.	1956	42	485	650	"
25-42-454	Townsend Scudder, Jr.	1965	62	200	100	"
25-42-594	Hillsborough Twp.Bd.of Ed.	1966	64	300	150	"

J. Geodetic Control Survey monuments described
Index Maps 29,33,34

A. Bound Brook, Monmouth Junction, New Brunswick, Plainfield

B. Raritan-Lower Raritan, Millstone

C. 2.

Map No.	Location	Period of Record
97	Millstone River at Blackwells Mills	1903-1904, 1921-
435	Six Mile Run near Middlebush	1968-

3. 97 Millstone River at Blackwells Mills 1964

Water Quality Standards: (explained in Atlas Sheet description)
TW1, FW2 except where classified FW3

D. Brunswick Formation (Trb), Diabase (Trdb)

E. 1. Physiographic Province: Piedmont
Subdivision: Triassic Lowlands
Major Topographic Features: Red Sandstone Plain
Elevations (ft.above sea level): ridges 130, valleys 20
Relief (ft.): 110

2. a. Normal Year: 44"
Dry Year: 33"
Wet Year: 51"

b. January: 31°F
July: 74°F

c. 238 days. Last killing frost: 4/20; first killing frost: 10/15

F. Div. of Water Resources:
Six Mile Run Reservoir
Delaware and Raritan Canal
Middlesex County:
Johnson Park
Somerset County:
Colonial Park
Spooky Brook Golf Course

I. Water Well Records

Location	Owner	Year Drilled	Screen Setting or Depth of Casing	Total Depth	g/m Yield	Formation
25-43-235	Air Reduction Co., Inc.	1959	27	310	108	Trb
✓25-43-342	Rutgers Preparatory School	1967	50	300	500	"
✓25-43-497	Overbrook Farm			173	75	"
✓25-43-538	Levitt & Sons, Inc.	1964	22	300	70	"
✓25-43-657	Phillips Concrete Co.	1967	42	300	125	"
✓25-43-666	Alpha Duct Wire & Cable Co.			827	31	"
✓25-43-669	"			531	12	"
✓25-43-692	Triangle Conduit & Cable			396	100	"

J. Geodetic Control Survey monuments described
Index Map 29,30,34

BLOCK #25-44,45

A. New Brunswick, Perth Amboy, Plainfield, South Amboy

B. Raritan-Lawrence, Lower Raritan, South River

C. 1. New Brunswick - Recording and non-recording temperature, precipitation and evaporation gauges

3. Map No.	Location	Period of Record
283	Raritan River at New Brunswick (Albany St. Bridge)	1964-
288	Lawrence Brook at New Brunswick Water Dept. Intake, Rt.18	1964-

Water Quality Standards: (explained in Atlas Sheet description) TW1, FW3

D. Magothy and Raritan Formation (Kmr), Brunswick Formation (Trb), Diabase (Trdb)

E. 1. Physiographic Province: Piedmont
Subdivision: Triassic Lowlands
Major Topographic Features: Wisconsin Terminal Moraine, Red Sandstone Plain
Elevations (ft.above sea level): hills 130, valleys 0
Relief (ft.): 130

Physiographic Province: Coastal Plain
Subdivision: Inner Plain
Major Topographic Features: Raritan Estuary, Clay and Marl Region
Elevations (ft.above sea level): hills 100, valleys 0
Relief (ft.): 100

2. a. Normal Year: 44"
Dry Year: 35"
Wet Year: 50"

b. January: 31°F
July: 74°F

c. 240 days. Last killing frost: 4/20; first killing frost: 10/15

F. Div. of Water Resources:
Delaware and Raritan Canal
Middlesex County:
Johnson Park

G. U.S. Army:
USARC and CFMS Camp Kilmer

H. Joyce Kilmer House, New Brunswick (State Owned)
Ivy Hall, Piscataway
Efriam Fitz Randolph House, Piscataway
Metlar House, Piscataway

I. Water Well Records

Location	Owner	Year Drilled	Screen Setting or Depth of Casing	Total Depth	g/m Yield	Formation
25-44-237	Ford Motor Co.			500	96	Trb
25-44-253	Middlesex Water Co.	1966	38	566	150	"
25-44-259	Twp. of Raritan			500	115	"
25-44-263	"			476	187	"
25-44-265	"			501	140	"
25-44-268	Ford Motor Co.			515	60	"
25-44-285	Twp. of Raritan			452	263	"
25-44-286	"			363	35	"
25-44-295	"			382	275	"
25-44-312	American Cholesterol Co.	1955	37	525	155	"
25-44-316	John F. Kennedy Hospital	1972	62	140	75	"
25-44-318	Revlon Co.			611	120	"
25-44-321	"			611	205	"
25-44-321	"			510	205	"
25-44-322	Holophane Co.	1961	41	256	100	"
25-44-342	Twp. of Raritan			307	300	"
25-44-344	"			562	75	"
25-44-368	"			457	12	"
25-44-376	"			520	20	"
✓25-44-422	Johnson & Johnson	1962	39	250	163	"
✓25-44-434	Thode's Inc.			509	85	"
✓25-44-445	DuPont deNemours & Co.			506	70	"
✓25-44-445	"			550	125	"
✓25-44-446	Richardson Co.			450	100	"
✓25-44-446	Triangle Conduit & Cable Co.			396	100	"
✓25-44-446	Rhodia, Inc.	1962	63	400	115	"
✓25-44-451	Monte Carlo Wine Ind.			332	80	"
✓25-44-482	Gulbenkian Seamless Rug Co.			650	70	"
✓25-44-651	Herbert Sand Co.			72	-	Q
✓25-44-651	"			72	-	"
✓25-44-654	"			75	-	"
25-45-117	Paraffine Co., Inc.			402	100	Kmr
25-45-118	"			417	165	"
25-45-129	Aluminum Co. of America	1959	-	27	108	Trb
25-45-132	Richmond Radiator Co., Inc.			352	15	Kmr
25-45-171	Raritan Arsenal			375	27	"

J. Geodetic Control Survey monuments described
Index Maps 30,34,35

BLOCK #28-02

A. Hightstown, Monmouth Junction, Princeton, Rocky Hill

B. Raritan-Millstone, Lawrence

C. 2.

Map No.	Location	Period of Record
96	Millstone River near Kingston	1933-1949
174	Delaware and Raritan Canal at Kingston	1947-
434	Bedens Brook near Rocky Hill	1967-

3.

Map No.	Location	Period of Record
96	Millstone River near Kingston	1965
304	Heathcote Brook at Kingston	1964-
305	Millstone River at Princeton	1965-
306	Millstone River at Rocky Hill	1964-
313	Bedens Brook on Rt.533	1965-

Water Quality Standards: (explained in Atlas Sheet description) FW2

D. Magothy and Raritan Formations (Kmr), Brunswick Formation (Trb), Lockatong Formation (Trl), Stockton Formation (Trs), Diabase (Trdb)

E. 1. Physiographic Province: Piedmont
Subdivision: Triassic Lowlands
Major Topographic Features: Red Sandstone Plain, Rocky Hill
Elevations (ft.above sea level): ridges 300, valleys 50
Relief (ft.): 250

2. a. Normal Year: 43"
Dry Year: 35"
Wet Year: 51"

b. January: 31°F
July: 75°F

c. 240 days. Last killing frost: 4/25; first killing frost: 10/20

F. Div. of Parks and Forestry:
Washington Crossing State Park
Delaware and Raritan Canal
Div. of Water Resources:
Cook Natural Area

H. Rockingham (Washington's Headquarters), State Owned

I. Water Well Records

Location	Owner	Year Drilled	Screen Setting or Depth of Casing	Total Depth	g/m Yield	Formation
28-02-112	Associated Dairies, Inc.	1960	27	400	400	Trb
28-02-119	Elizabethtown Water Co.	1964	21	398	225	"
28-02-135	"	1964	19	223	300	"
28-02-175	Elizabeth Water Co.	1965	50	335	300	"
28-02-179	Elizabethtown Water Co.	1965	50	305	400	"
28-02-468	Ingersoll-Rand Co.	1964	40	506	125	"
28-02-498	Rocky Hill Realty Co.	1962	40	500	205	"
28-02-661	Brunswicktown Water Co.	1960	52	347	250	"
28-02-665	"	1959	42	599	128	"
28-02-982	Manor Real Estate & Trust Co.	1957	49	213	68	Trl
28-02-985	Dow Jones & Co.,Inc.	1962	37	505	135	"
28-02-987	Elwood Landis	1956	70	371	150	"

J. Geodetic Control Survey monuments described
Index Maps 33,34,37

A. Hightstown, Jamesburg, Monmouth Junction, New Brunswick

B. Raritan-Lawrence, Millstone

C. 2.

Map No.	Location	Period of Record
104	Lawrence Brook at Patricks Corner	1922-1927

Water Quality Standards: (explained in Atlas Sheet description)
FW2 except where FW3

D. Magothy and Raritan Formation (Kmr), Brunswick Formation (Trb), Lockatong Formation (Trl), Stockton Formation (Trs), Diabase (Trdb)

E. 1. Physiographic Province: Piedmont
Subdivision: Triassic Lowlands
Major Topographic Features: Red Sandstone Plain, Rocky Hill
Elevations (ft.above sea level): hills 250, valleys 50
Relief (ft.): 200

Physiographic Province: Coastal Plain
Subdivision: Inner Plain
Major Topographic Features: Clay and Marl Region
Elevations (ft.above sea level): hills 100, valleys 50
Relief (ft.): 50

2. a. Normal Year: 44"
Dry Year: 34"
Wet Year: 51"

b. January: 31°F
July: 75°F

c. 240 days. Last killing frost: 4/25; first killing frost: 10/20

F. Div. of Water Resources:
Delaware and Raritan Canal
Six Mile Run Reservoir
Div. of Parks and Forestry:
Pigeon Swamp
Lawrence Brook Reservoir:
Municipal Watershed

I. Water Well Records

Location	Owner	Year Drilled	Screen Setting or Depth of Casing	Total Depth	g/m Yield	Formation
✓28-03-195	Franklin House Bldg.Corp.	1973	52	279	100	Trb
✓28-03-257	N.J. Bell Telephone Co.	1959	43	412	68	"
✓28-03-299	Johnson & Johnson Co.	1963	31	302	128	"
28-03-417	Brunswicktown Water Co.	1957	49	448	246	"
28-03-418	"	1959	32	805	110	"
28-03-419	"	1960	59	486	90	"
28-03-432	St.Augustine's School	1962	42	300	100	"
28-03-525	Ashwill Corp.	1954	31	251	480	"
28-03-775	Princeton Nurseries	1957	62	454	100	Trl
28-03-882	Interntl.Business Mach.	1958	116	230	281	Trb
28-03-891	S.Bruns.Mun.Util.Auth.	1963	95/115	118	1250	Kmr
28-03-893	Mid-East Anodizing Corp.	1964	101/116	118	200	"
28-03-898	S.Bruns.Mun.Util.Auth.	1971	103/138	138	1200	"
28-03-975	"	1963	110/135	138	1200	"

J. Geodetic Control Survey monuments described
Index Maps 34,37,38

BLOCK #28-04,05 8/76

A. Freehold, Jamesburg, New Brunswick, South Amboy

B. Raritan-Lawrence, Lower Raritan, South River

C. 2.

Map No.	Location	Period of Record
105	Lawrence Brook at Farrington Dam	1927-
106	Matchaponix Brook at Spotswood	1957-1962
107	Manalapan Brook at Spotswood	1957-
108	South River at Old Bridge	1939-

3.

108	South River at Old Bridge	1964-
289	South River at Old Bridge	1964-
290	South River at South River	

Water Quality Standards: (explained in Atlas Sheet description) FW2

D. Woodbury Clay (Kwb), Merchantville Clay (Kmv), Magothy and Raritan Formation (Kmr), Brunswick Formation (Trb)

E. 1. Physiographic Province: Piedmont
Subdivision: Triassic Lowlands
Major Topographic Features: Red Sandstone Plain
Elevations (ft.above sea level): ridges 120, valleys 20
Relief (ft.): 100

Physiographic Province: Coastal Plain
Subdivision: Inner Plain
Major Topographic Features: Clay and Marl Region
Elevations (ft.above sea level): ridges 150, valleys 0
Relief (ft.): 150

2. a. Normal Year: 45"
Dry Year: 34"
Wet Year: 51"

b. January: 31°F
July: 74°F

c. 240 days. Last killing frost: 4/25; first killing frost 10/20

F. Div. of Parks and Forestry:
Pigeon Swamp
Middlesex County:
Tamarack County Golf Course
Lawrence Brook Reservoir:
Municipal Watershed
South River:
Municipal Watershed

I. Water Well Records

Location	Owner	Year Drilled	Screen Setting or Depth of Casing	Total Depth	g/m Yield	Formation
28-04-249	Firefyter	1956	72/82	82	30	Kmr
28-04-257	"	1962	60/78	200	260	"
28-04-371	Larry J. Smith	1972	139/150	150	60	"
28-04-454	Tamarack Golf Course	1975	87/107	124	302	"
28-04-559	E. Brunswick Twp.	1955	180/220	220	1000	"
28-04-563	Edward Collins	1954	198/223	223	500	"
28-04-575	E. Brunswick Twp.	1975	162/221	221	310	"
28-04-576	"	1975	217/281	319	540	"
28-04-576	"	1975	119/144	201	325	"
28-04-582	Metal Deck, Inc.	1968	200/230	230	300	"
28-04-582	" (Recharge)	1969	203/233	233	60	"
28-04-583	Joseph Konuk	1956	225/245	245	300	"
28-04-695	Kimberly Clark Corp.	1961	235/275	280	1000	"
28-04-698	"	1961	49/59	59	400	"
28-04-698	"	1960	58/68	68	600	"
28-04-698	Anheuser Busch, Inc.	1957	55/70	70	600	"
28-04-699	Kimberly Clark Corp.	1961	53/63	63	500	"
28-04-732	Lawrence Smith	1958	213/223	223	692	"
28-04-751	Mustapha Ahmed	1958	178/208	208	650	"
28-04-814	E. Brunswick Twp.	1975	161/215	215	500	"
28-04-867	Spotswood Boro	1973	63/78	91	509	"
28-04-927	"	1957	64/85	90	400	"
28-04-927	"	1958	62/83	83	700	"
28-04-929	Duhernal Water System	1955	54/64	64	500	"
28-04-931	"	1955	67/77	77	700	"
28-04-987	Reliable Water Co.	1963	131/161	161	500	"
28-04-988	"	1957	143/155	155	188	"
28-05-166	Sayreville Boro	1965	79/93	93	300	"
28-05-169	"	1960	83/94	99	700	"
28-05-172	Sayreville Paper Board	1958	110/120	120	100	"
28-05-193	Sayreville Boro	1960	67/83	83	350	"
28-05-195	"	1960	56/87	87	350	"
28-05-199	"	1965	63/83	83	200	"
28-05-412	South River Boro	1966	189/198	198	175	"
28-05-412	"	1967	160/196	198	1130	"
28-05-431	Sayreville Boro	1965	73/90	90	737	"
28-05-431	"	1967	225/280	280	1000	"
28-05-431	Sunshine Biscuit	1967	160/172	174	65	"
28-05-436	Perth Amboy City	1965	50/80	80	500	"
28-05-438	Perth Amboy Water Co.	1968	201/261	261	1500	"
28-05-439	Perth Amboy City	1955	52/67	69	700	"
28-05-477	Duhernal Water System	1953	55/65	65	483	"
28-05-722	Madison Twp.Mun.Util.Auth.	1972	90/120	120	900	"
28-05-722	"	1972	80/120	120	600	"
28-05-726	Madison Water Co.	1957	280/312	312	500	"
28-05-726	"	1963	266/350	350	500	"

J. Geodetic Control Survey monuments described
Index Maps 34,35,38; adjacent Index Map 34

SUBJECT TO REVISION

WATER WITHDRAWAL POINTS AND NJGS CASE INDEX SITES WITHIN 5.0 MILES OF:

LATITUDE 402847
LONGITUDE 742917

DRAFT

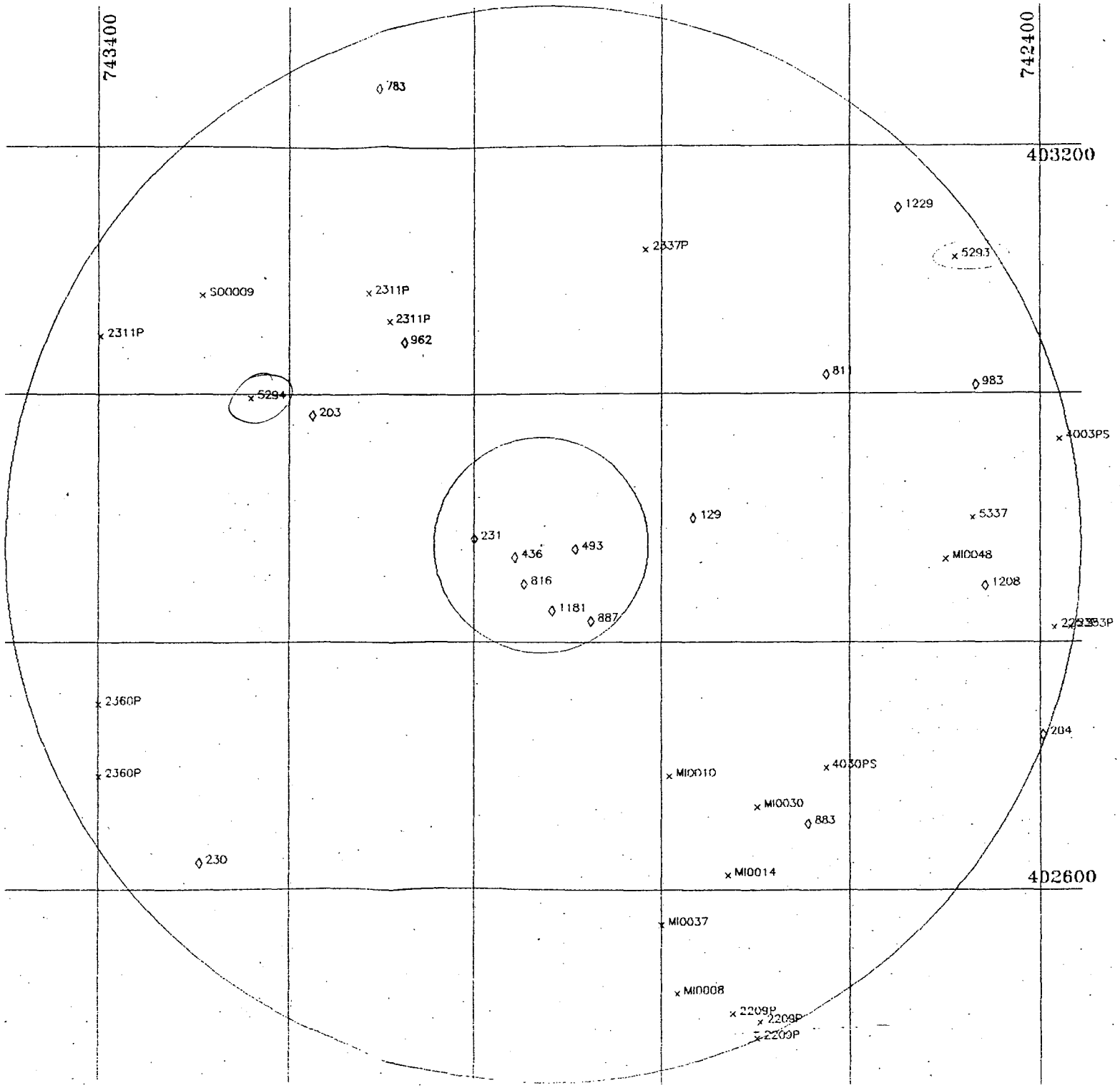
SCALE: 1:63,360
(1 Inch = 1 Mile)

× WATER WITHDRAWAL POINTS
◊ NJGS CASE INDEX SITES
1 MILE AND 5 MILE RADII INDICATED

NJGS CASE INDEX DATA RETRIEVED FROM:
NEW JERSEY GEOLOGICAL SURVEY
ON 12/22/87

PLOT PRODUCED BY:
NJDEP
DIVISION OF WATER RESOURCES
BUREAU OF WATER ALLOCATION
CN-029
TRENTON, NJ 08625

DATE: 05/27/88



SUBJECT TO REVISION

Page 1 of PRELIMINARY SURVEY OF WATER WITHDRAWAL POINTS WITHIN 5.0 MILES OF 402247 LAT. 742917 LON. (IN ORDER BY PERMIT NUMBER) - 05/27/75

NUMBER	NAME	SOURCEID	LOCID	LAT	LON	LLACC	DISTANCE	COUNTY	MUN	DEPTH	GEOL	GEOL	CAPACITY
2329P	MIDDLESEX CO. DEPT. OF PARKS	2506706	1	402448	742700	S	5.0	23	04	107	GKRF		300
	MIDDLESEX CO. DEPT. OF PARKS	POND 1		402500	742715		4.7	23	04		SRLAW		
	MIDDLESEX CO. DEPT. OF PARKS	STORAGE POND		402454	742652	T	4.9	23	04	15			700
2253P	HERBERT SAND CO., INC.	2804017	1 INFIL GA	402607	742351	F	4.6	23	04	15	GKRF		210
	HERBERT SAND CO., INC.	4600199	2 INFIL GA	402607	742341		5.0	23	04	14	GKRF		400
2311P	SOMERSET COUNTY PARK COMM.	2521534	1	403049	743109	E	2.6	18	06	400	GTRB		275
	SOMERSET COUNTY PARK COMM.	QUAIL POND		403035	743055	E	2.5	18	02	9	G		650
	SOMERSET COUNTY PARK COMM.	SPOOKY POND		403028	743359	C	4.5	18	08	9	G		1100
2337P	RUTGERS UNIVERSITY/ GOLF COURSE	2521442		403110	742810	E	2.9	23	17	300	GTRB		420
	RUTGERS UNIVERSITY GOLF COURSE	STORAGE POND		403110	742810		2.9	23	17		R		500
2340P	COLFAX COMPANIES	4800305	3	402455	743400	C	4.7	25	13	100	GTRB		
	COLFAX COMPANIES	3805160	5	402736	743400		4.4	25	13	197	GTRB		150
4002PS	PUBLIC SERVICE ELECTRIC & GAS	SILVER	LAKE	402935	742348	F	4.9	23	05	6	SR		2229
4003PS	ALSOL CORPORATION	LAWRENCE	BROOK	402359	742615	T	3.4	23	12		SRLAW		700
5293	MIDDLESEX WATER COMPANY	2513518	THERMAL	403106	742454		4.7	23	05	566	GTRB		2000
5294	MIDDLESEX WATER COMPANY	2510021	MAPLE AV 1	402958	743225		5.1	33	06	351	GTRB		600
5307	NEW BRUNSWICK, CITY OF	LAWRENCE BROOK	INTAKE #1	402738	742443		4.0	23	14		SRLAW		7292
	NEW BRUNSWICK, CITY OF	LAWRENCE BROOK	INTAKE #2	402758	742443		4.0	23	14		SRLAW		4167
	NEW BRUNSWICK, CITY OF	LAWRENCE BROOK	INTAKE #3	402743	742443		4.0	23	14		SRLAW		6250
	NEW BRUNSWICK, CITY OF	LAWRENCE BROOK	INTAKE #4	402728	742443		4.0	23	14		SRLAW		
MI0025	GIANNAREAS, JAMES	4600243	1	402512	742750	U	4.3	23	04	30	GKRF		100
	GIANNAREAS, JAMES	POND		402516	742750	U	4.3	23	04		SRLAW		
MI0010	KARTIKIS SOD FARM %FARM SOLD%	POND	1	401645	742755	T	2.5	23	15	12	GKMR		
MI0014	HAEFNER, THEODORE -NOT FARMING	POND 1		402407	742715	U	3.5	23			SRMIL		
MI0030	FOERTER, ALBERT	POND	1	402640	742700	T	3.1	23	04	20	GKMR		
MI0037	BAILES, JOSEPH	BEAVERDAM BR.	STREAM 1	402043	742800	T	2.7	23	04		SRLAW		
	BAILES, JOSEPH	POND	1	402543	742800	T	3.7	23	04	4.5	GKMR		
MI0046	RUTGERS UNIVERSITY	WESTONHILL POND	STREAM 1	403049	742500	T	3.8	23	14		SREER		
	RUTGERS UNIVERSITY	2504716	WELL 1	403049	742500	T	3.8	23	14	170			30
MI0049	TOTO, FRANK	POND		402849	743255	T	3.9	23	08	150	GTRB		

Number of Observations: 30

Dan Raviv Associates, Inc.
Consultants in ground water hydrology, water quality and landfill hydrology

HYDROGEOLOGIC AND SOILS INVESTIGATION
W.A. Cleary Chemical Corporation
Somerset, New Jersey
VOLUME I - TEXT

DRAI Job No. 86C366

Prepared for:

Greenstone and Sokol
Counsellors at Law
226 West State Street
Trenton, New Jersey 08625

Attn: Steven J. Picco, Esq.

Prepared by:

Dan Raviv Associates, Inc.
5 Central Avenue
West Orange, New Jersey

April 1987

ATTACHMENT A

Dan Raviv Associates, Inc.
Consultants in ground water hydrology, water quality and landfill hydrology

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ATTACHMENT A

Dan Raviv Associates, Inc.
Consultants in ground water hydrology, water quality and landfill hydrology

May 18, 1987

Greenstone and Sokol
Counsellors at Law
226 West State Street
Trenton, New Jersey 08625

Attention: Steven J. Picco, Esq.

Re: Transmittal of Soils and Hydrogeologic Report
W.A. Cleary Chemical Corporation
Franklin Township, Somerset County
DRAI Job No. 86C366

Gentlemen:

As requested, Dan Raviv Associates, Inc. (DRAI) has completed a preliminary soils and hydrogeologic investigation at the site of the W.A. Clearly Chemical Corporation (Cleary) located in Franklin Township, Somerset County, New Jersey. The investigation included the accumulation and review of existing data pertinent to the site, as well as field investigations which included soil and ground water sampling and analyses. The Tara Greens Golf Course, which adjoins the Cleary manufacturing facility, was also sampled.

DRAI has made an effort to delineate the horizontal and vertical extent of soil and ground water contamination at the Cleary site based on existing data and by collecting supplemental data.

This report is primarily a data report with minimum interpretation with regard to soil remediation and the local ground water flow system. In the absence of site specific cleanup action levels, DRAI selected the present ECRA guidelines as the reference concentrations for the appropriate parameters. As our investigation and sampling progressed, we realized that the soils in the vicinity of the chemical plant and the former lagoon are contaminated with mercury, arsenic and cadmium. The last soil sampling was conducted on March 12, 1987.

Additional monitoring wells are recommended and additional soil sampling will be required to further refine the extent of soil contamination.

We will be forwarding to you the proposed supplemental soil sampling plan with the appropriate protocols for transmittal to the NJDEP.

5 Central Avenue, West Orange, New Jersey 07052 (201) 325-0806

ATTACHMENT A

If you have any questions or need further information, please call.

Very truly yours,

DAN RAVIV ASSOCIATES, INC.

Dan D. Raviv, Ph.D.
President

DDR/lb
Enc.
cc: Mr. Steven J. Anderson, Geologist
(NJDEP/DWR-Bureau of Ground Water Discharge Permits)
Mr. Joseph M. Mikulka, Chief
(NJDEP/Northern Region, Enforcement Element)

ATTACHMENT A

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ATTACHMENT A

HYDROGEOLOGIC AND SOILS INVESTIGATION
W.A. Cleary Chemical Corporation
Franklin Township, Somerset County, New Jersey

1.0 INTRODUCTION

This report summarizes the findings and recommendations on the hydrogeologic and subsurface conditions at the W.A. Cleary Chemical Corp. (Cleary), Franklin Township, Somerset County, New Jersey. The investigation was conducted by Dan Raviv Associates, Inc., (DRAI) at the request of Greenstone and Sokol, Counselors at Law, Trenton, New Jersey.

1.1 Objectives

Objectives of the investigation were to:

(1) compile available and new data into one report;
(2) define contaminant distribution in the soils and ground water;
(3) conduct additional ground water sampling, soil sampling and evaluate location of additional monitoring wells;
(4) determine hydraulic characteristics of the shallow and deep aquifer systems and their degree of interconnection;
(5) assess long-term monitoring requirements;
(6) identify the need for site remediation.

1.2 Scope of Work

The investigation conducted by DRAI included accumulation and review of existing data pertinent to the site and the surrounding area, including geologic logs, water quality analyses results and ground water level measurements. DRAI also conducted field studies to obtain additional data on soil and ground water quality, ground water elevation changes, and aquifer characteristics. DRAI then evaluated the data to assess the occurrence and distribution of soil and ground water contamination at the site, as well as to determine the need for additional data gathering.

Based on the data and their interpretation, DRAI will prepare soils and ground water remediation alternatives to be submitted to the New Jersey Department of Environmental Protection (NJDEP). This remediation plan will not be developed until comments on the Investigation Report are received from NJDEP.

2.0 SETTING

2.1 Site Description

The approximately 136-acre site in Franklin Township is bordered on the southeast by Route 27, on the north by the N.J.R.R., on the northwest and west by woods and on the south by developing commercial property (Figure 1).

About 8 acres in the southwestern portion of the site are used for facilities relating to the manufacture and storage of food additives, pesticides, herbicides and fertilizers. The remainder of the site is developed as the Tara Greens Golf Course and Driving Range (Figure 2).

There are 3 ponds or lagoons presently on the site and an artificially-created brook which runs from the area of the plant eastward across the Golf Course (Figure 2).

2.2 Geology

Bedrock at the site is identified as the Brunswick Shale of Triassic age. The Brunswick Shale at the Cleary site consists primarily of interbedded, reddish mudstone and siltstone. The bedrock beds are generally inclined in a northwesterly direction at an average angle of approximately 17 degrees. Depth to bedrock at the location of the manufacturing facility on the Cleary site ranges from 6 to 8 feet.

2.3 Ground Water

The Brunswick Shale is a major water-bearing formation (aquifer) in portions of central and northeastern New Jersey and is the main aquifer in Franklin Township. A measured strike of N55^{o}E and a bedding dip of 17^{o}NW at the Cleary site is typical of the Brunswick Shale. The formation exhibits directional, rather than isotropic, behavior with maximum ground water flow following the incline of the bedding plane.

Joints and intersecting fractures that have resulted from jointing provide the principal means for the flow of ground water in the Brunswick Shale toward the producing wells. Depending on the location and depth of wells, the Brunswick Shale is capable of supporting low-to-moderate-yielding ground water supplies. "The Middlesex County 208 Area-Wide Ground Water Analysis" report indicates that bedrock transmissivity in the vicinity of Cleary ranges between 1,000 and 3,000 gallons per day per foot (gpd/ft), which is considered low.

The pH of ground water is partially determined by the mineral content of soil. At Cleary, the pH of ground water is in the range of 6.5 - 8.5, indicating the presence of carbonate minerals in the Brunswick Shale.

2.4 Surface Water

Present surface water bodies at the Cleary site consist of a well water pond, a bentonite-lined settling pond and an unlined infiltration pond. The well water and settling ponds are near the plant, while the

infiltration pond is located on the eastern portion of the site and serves as a water source for irrigating the golf course. An artificially-created brook extends from the settling pond eastward across the golf course past the infiltration pond, eventually discharging into Six Mile Run. There is also an underground cinderblock settling tank which feeds into the settling pond. The tank and lagoons are, thus, all interconnected, either by underground piping or the brook.

Until March 1986, there was also an agricultural chemical lagoon of about 8,000 square feet (Figure 2).

The manufacturing plant area drains mainly to the south and southwest. Surface runoff, overflow from the well water and settling ponds and, previously, overflow from the chemical lagoon would, therefore, drain largely into areas away from the plant itself.

3.0 SOILS EVALUATION

3.1 Applicable Standards

In the absence of site-specific cleanup standards, the New Jersey Environmental Cleanup Responsibility Act (ECRA) action levels for soils cleanup were used as a guideline for site evaluation. It is recommended that these guidelines be adhered to in evaluating and remediating the site, so that future cleanup of the property will be considered acceptable by the NJDEP.

The following action levels for site characterization were used:

(1) Soils - Arsenic - 20 mg/kg (ppm)
Cadmium - 3 ppm
Mercury - 1 ppm
Total volatile organic compounds - 1 ppm
Total Pesticides - 1 ppm
(2) Ground water - Total VOC's - 50 ppb
Benzene - 5 ppb

3.2 Sampling and Analytical Methodology

All DRAI soils sampling was conducted in accordance with NJDEP protocols and Chain of Custody was maintained. Soil Samples collected by DRAI were analyzed by S-R Analytical, Inc. Laboratory analyses were performed according to approved EPA methods. A complete description of all sampling and analytical procedures is attached in Volume II of this report.

No information is available on pre-DRAI sampling procedures, with the exception of the 1984 Dioxin Study, attached as Appendix A. Samples collected by the Cleary personnel were analyzed by the following laboratories:

(1) Princeton Testing Laboratory;
(2) Rossnagel and Associates; and
(3) New Jersey Laboratories.

3.3 Sampling and Results

3.3.1 Metals

Pre-DRAI Testing

September 17, 1980: The NJDEP obtained two core samples from the former chemical lagoon. Results indicated 636 and 795 ppm arsenic and 86 and 7 ppm mercury.

October 27, 1981: Officials of the NJDEP collected soils samples from the tree line behind the plant in the area of the former lagoon, apparently used for sludge disposal. Analysis of the four samples indicated: arsenic levels ranging from 1,819 to 4,588 ppm, averaging 3,209 ppm; cadmium levels ranging from 3,869 to 17,720 ppm, averaging 10,917 ppm; and mercury levels ranging from 70 to 700 ppm, averaging 538 ppm. The exact locations of these samples are unknown.

December 15, 1981: The NJDEP obtained a "split" composite sample from a selected area along the tree line. Analysis indicated 729 ppm arsenic, 1,420 ppm cadmium and 16 ppm mercury. W.A. Cleary also had its composite sample analyzed, results indicating 1,100 ppm arsenic, 3,100 ppm cadmium and 13,500 ppm mercury.

June 5 and 23, 1986: Cleary personnel collected a total of 50 composite soil samples at 0 to 1 foot (Figure 3). Of these, 40 were analyzed - 15 from the former chemical lagoon and 25 from outside the lagoon (See Figure 3). Analytical results on the 25 samples taken outside the lagoon (#1 - #35) showed wide ranges of concentrations: Arsenic ranged from ND to 904 ppm; 15 of the samples exceeded guidelines. Cadmium ranged from 0.2 to 1,620 ppm; 18 samples exceeded guidelines. Mercury ranged from 0.1 to 40.8 ppm; 16 samples exceeded guidelines. The highest levels outside the lagoon were found in soils south and southwest of the lagoon and the still. Analytical results on lagoon samples (#36 -#50) indicated the following: Arsenic levels ranged from 8.7 to 676 ppm, averaging 280 ppm; all but one sample exceeded ECRA 20 ppm cleanup guidelines. Cadmium levels ranged from 1.1 to 181 ppm, averaging 47 ppm; all but 1 sample exceeded ECRA 3 ppm guidelines. Mercury levels ranged from 0.3 to 6.5 ppm, averaging 3 ppm; all but 2 samples exceeded 1 ppm guidelines. Since the analysis of the soil samples was conducted using dilute nitric acid, rather than the concentrated nitric acid which is necessary to obtain total metal concentrations in soils, they cannot be compared to the 1980 and 1981 NJDEP results. They do indicate, however, that, even using dilute acid, metals contents in many areas exceed ECRA cleanup action levels. (Table I and Figure 3).

December 16 and 17, 1986: Cleary personnel again sampled soils around the facility to a depth of one foot. Fifteen samples were analyzed, using concentrated nitric acid to obtain total metals content (Figure 4). Results ranged from ND to 545 ppm for arsenic, averaging 90 ppm and exceeding guidelines in 10 cases; 1.1 to 134 ppm for cadmium, averaging 30 ppm and exceeding action levels in 12 cases; and 1.2 to 1000 ppm for mercury, averaging 194 ppm and exceeding guidelines in all 15 cases. Metals concentrations were much higher than the June 1986 results in some areas that were sampled and analyzed both times. This is consistent with the use of concentrated vs. dilute acid (Table I and Figure 4).

DRAI Testing

January 30 and February 2, 1987: DRAI personnel resampled the soils around the Cleary facility in accordance with NJDEP protocols. Sampling depths ranged from 0 to 4 feet. Fifteen soil samples were analyzed by approved EPA methods to accurately establish total metal concentrations (Figure 5). With few exceptions, metal concentrations were appreciably greater when compared with June 1986 sample analyses, but were comparable to the analyses of December 16 and 17, 1986. Arsenic ranged from 2.3 to 870 ppm, averaging 130 ppm and exceeding action levels in 8 cases; cadmium ranged from ND to 250 ppm, averaging 39 ppm and exceeding guidelines in 7 cases; and mercury ranged from 0.9 to 25,000 ppm, averaging 2,977 ppm and exceeding guidelines in 14 cases. The highest concentrations for all three

metals were found near the still at the 1-2 foot level (Figure 5). In general, concentrations decreased with depth (Figure 5 and Table I).

February 19 and March 10 and 11, 1987: DRAI personnel again sampled soils around the Cleary facility. Sampling depths ranged from surface to 8 feet (bedrock); some borings were sampled at 1 foot intervals from surface to bedrock (Figure 6). Sixty-six samples were analyzed in accordance with approved EPA methods. Arsenic ranged from 1.9 ppm to 950 ppm, averaging 57 ppm and exceeding action levels in 17 samples; cadmium ranged from ND to 140 ppm, averaging 7 ppm and exceeding action levels in 18 samples; mercury ranged from ND to 110,000 ppm, averaging 2,250 ppm and exceeding action levels in 39 samples. Mercury was generally the limiting consituent with increasing depth and exceeded ECRA action levels at bedrock near the still and south of the old chemical lagoon (Figure 6 and Table I).

February 18 and 19 and March 12 and 13, 1987: DRAI personnel sampled soils at the Food Additive Building septic tank (the "pit"), the stream it feeds, and the eastern edge of the unlined lagoon fed by the stream (Figured 7). Sampling depths ranged from surface to 7.5 feet. Thirteen samples were analyzed. The 4 septic tank sample results indicated: Arsenic ranged from 5.5 to 240 ppm, averaged 24 ppm and exceeded action levels in 1 sample; arsenic contamination was as high as 73 ppm at 0 to 1 foot and 240 ppm at 5 to 5.5 feet. Cadmium ranged from ND to 20 ppm, averaged 6 ppm and exceeded action levels in 1 sample; cadmium was as high as 20 ppm at 0 to 1 foot. Mercury ranged from 4.6 to 30 ppm, averaged 13 ppm, and exceeded action levels in all 4 samples; mercury was as high as 30 ppm at 0 to 1 foot and 9.6 ppm at 7 to 7.5 feet. The 9 stream and infiltration pond samples showed: high levels of mercury in 8 samples, ranging from 1.1 to 22 ppm; and high (47 and 24 ppm) arsenic levels at the eastern end of the stream (Figure 7 and Table I).

February 18 and 19, 1987 and March 12, 1987: The Tara Greens Golf Course is part of the W.A. Cleary facility. To determine baseline conditions at the Golf Course, it was decided to also sample the Golf Course soils and analyze for metals, pesticides and volatile organic compounds (VOC's). DRAI personnel sampled random soil borings throughout the golf course (Figure 8). Sampling depths ranged from the surface to 3 feet. Twenty six samples were analyzed: arsenic was within the 20 ppm guideline in all samples; cadmium was detected above the 3 ppm ECRA limit in only one case at 3.8 ppm, and then only one foot below grade; mercury exceeded the 1 ppm action level in 6 samples ranging from 1 to 2.3 ppm; however, mercury concentrations were less than 1 ppm to ND below the one-foot depth. (Figure 8 and Table III).

Based on these results, it would appear that the golf course is not a source of metals contamination.

3.3.2 Organics and Pesticides

Pre-DRAI Testing

National Dioxin Study samples, taken on November 26, 1984, are included as Appendix A. Results are negative.

DRAI Testing

Between January and March 1987, a total of 18 samples were taken for volatile organic compounds (VOC's) analysis. Of those samples, two had VOC's above 1 ppm (i.e., 1.93 and 1.40 ppm), two had VOC's detected below 1 ppm (i.e., 0.91 and 0.94 ppm), and all others were reported as ND. A total of 16 samples were taken for pesticides analysis. All results were reported as ND. The results are discussed below (Figures 5, 6, 7 and 8 and Table IV):

January 30 and February 2, 1987: DRAI collected 15 samples for analysis at depths from 0 to 4 feet. Three samples were analyzed for VOC's. No identifiable volatile organics that could not be attributed to laboratory contamination were detected (Figure 5 and Table IV).

February 19 and March 10 and 11, 1987: DRAI collected 66 samples at depths of from 0 to 8 feet. Nine samples were analyzed for VOC's and 12 for pesticides. No VOC's or pesticides were detected (Figure 6 and Table IV).

February 18 and 19 and March 11 and 12, 1987: DRAI sampled soils at the food additive septic tank, the stream it feeds and the eastern edge of the unlined lagoon fed by the stream. Thirteen samples were gathered at depths ranging from surface to 7.5 feet. Three samples were analyzed for VOC's and one for pesticides. No pesticides were detected; one downstream sample contained 0.94 ppm toluene, which may have been the result of laboratory contamination (Figure 7 and Table IV).

February 18 and 19 and March 12, 1987: DRAI sampled the Tara Greens Golf Course at depths from surface to 3 feet. Three samples were analyzed for pesticides and three for VOC's. No detectable levels were found (Figure 8 and Table IV).

3.4 Soil Characteristics

Soils at the Cleary site are basically silt loams and silty clay loams. This results in a topsoil with relatively low organic content and high porosity, but low permeability. The presence of clays indicates that the soil's cation exchange ability is at least moderate, despite the low organic content. With the exception of the soil layer, surficial deposits appear limited. Some fluvial sediment, about 0.5 foot thick, is present at a depth of 2.5 feet in certain areas (see well logs Appendix B).

3.5 Contaminant Migration

The migration of metals in the soil is generally dependent on the cation exchange capacity of the soil and the soluability of the metals. The soils on-site contain fairly large amounts of clay, resulting in a moderate to good ability to retain metals. This ability is further enhanced by the relatively neutral ph of the ground water pH.

Solvents (VOC's) migration is largely determined by their soluability, density, the soil's permeability and the moisture content of the soils. VOC's are not as readily adsorbed onto soil surfaces; they either migrate downward or diffuse upward. Diffusion is most rapid in drier soils, which also enhance bacterial degradation due to their oxygen content. The low-permeability, low-moisture soils at the Cleary site should, therefore,

tend to decrease downward migration and enhance both bacterial degradation and diffusion of VOC's.

Once organic chemicals or heavy metal complexes reach the fractured rock of the Brunswick Shale, however, there is little or no attenuation of these contaminants.

The large number of soil borings serve to delineate the areas and extent of soil contamination. One area is somewhat horseshoe shaped, with its midpoint located east of the still where phenymercuric acetate solutions are reported to have been manufactured (Figures 3 through 6). A shallow lagoon that existed here was subject to overflowing. Another area includes the old chemical lagoon and land to its west side. The old chemical lagoon was also subject to overflowing. A third area is the septic system leach bed, located east of monitor wells 3S and 3D (Figures 3 through 6). This leach bed received sanitary and possibly chemical laboratory waste. The combined results are that much of the land surrounding the manufacturing facility is contaminated with metals. The horizontal distribution of metals contamination in soils generally follows the contours of the land, indicating the overland flow of metal-laden solutions occurred up to and probably past the western and southwestern property lines.

Metal contaminants appear to decrease with depth in most areas sampled, which is to be expected due to the presence of clay in the soils. However, this decrease is not consistent for all the areas sampled, as can be seen in sampling results presented on Figure 6. In addition, in some locations metal concentrations were above action levels at depths near or at local bedrock.

Additional sampling will be performed at selected locations of the site to further delineate both the horizontal and vertical distribution of metals in site soils.

Laboratory results do not indicate VOC and pesticide soils contamination near the manufacturing area.

3.6 Remediation

Contaminated liquid was removed from the agricultural lagoon in March 1986; soil was removed in June and August 1986. Cleary undertook additional remediation efforts by removing the top one foot of soil from approximately 2.1 acres of land in and around the old chemical lagoon and chemical plant, as shown by the outlined area on Figure 3. This remediation was not intended to be final, but was designed as a cost-saving measure due to the rapidly increasing cost of removing contaminated soil. The NJDEP was notified on soil removal by W.A. Cleary.

Prior to any future remediation of contaminated soils, a plan for soil sampling for heavy metals will be submitted to the NJDEP for approval. The supplemental soil sampling plan will include the depth at which samples will be taken; the sampling methodology, equipment and containers; procedures for decontamination of equipment between samplings; sample storage and chain of custody procedures. A risk analysis for metal concentrations greater than those allowed under current ECRA regulations may also be necessary, if the soil action level for a particular metal(s) cannot be met. This decision will be partly based on the future use of the site.

4.0 HYDROGEOLOGIC EVALUATION

4.1 Applicable Standards

NJDEP ground water quality standards are listed in Table V for GW2 ground water, which encompasses most of the state of New Jersey, including the Cleary site. In addition, the present action level of 50 ppb total volatile organic compounds (VOC's) and 5 ppb for benzene were also considered.

4.2 On-Site Wells

4.2.1 Monitoring Wells

A total of 12 monitoring wells are presently on the site. All monitoring wells were installed by William Stothoff Co Inc., in accordance with NJDEP specifications, on the following dates:

1983 (March) - MW 1, 2, 3S, 4, 5, 6 and 7 were installed in response to NJDEP's requirements. MW 1 and 2 were designed to monitor any seepage from the food processing filtration/percolation lagoons.

1986 (May-June) - MW 3D, 8, 9S and 9D were installed in response to the combined NJPDES permit of January 21, 1986. Wells MW 9S and 9D were intended to monitor ground water quality at a point downgradient from the old chemical lagoon and the plant.

1987 (April) - MW 10D was installed to monitor pollution near the western property line. It is presently scheduled to be surveyed and sampled. Well installation procedures and diagrams are shown in Appendix C.

4.2.2 Production Wells

Three wells are present on the site:

"New Production Well" - a production well installed in 1972 (+ or -), it has a depth of 355 feet.

"Old Production Well" - a former production well installed in the 1940's and unused since 1972, it has a depth of 155 feet.

Well #3 - a dug well dating back to the early 1800's and no longer in use, it has a depth of about 40 feet. This well is located in front of the office building (Figure 9).

The old six-inch diameter production well at the Cleary site was abandoned because of insufficient yield. The new six-inch production well, with an approximate depth of 355 feet, appears to have a satisfactory yield.

4.2.3 Additional Well Data

Locations of the ground water monitoring wells, the old production well, and the new production well are shown on Figures 2 and 9, while specifications for the monitoring wells are summarized in Table VI. Well

records and logs for the monitoring wells are attached as Appendix B, and monitoring well construction diagrams are attached as Appendix C.

4.3 Sampling and Analytical Methodology

All ground water sampling conducted by DRAI was performed in accordance with NJDEP protocols. Proper chain of custody was followed and analyses were conducted according to approved EPA methods.

4.4 Sampling Results

4.4.1 Monitoring Wells

Pre-DRAI Testing

October 9, 1983: MW 1 through 7 (a total of 7 wells) were each sampled and analyzed for metals, VOC's, and pesticides. Samples for metals analysis were not filtered, so total metal concentrations were reported.

The results for lead and pesticides in all wells were ND. Arsenic results ranged from 28 to 3,057 ppb, with standards exceeded in 4 wells: 3S, 4, 5 and 6. Cadmium results ranged from 1 to 166 ppb, with standards exceeded in 5 wells: 2, 3S, 4, 5 and 6. Mercury ranged from .5 to 6 ppb, with standards exceeded in 2 wells: 3S and 4. Only MW 1 did not exceed any metals standards.

Volatile organics exceeded the total VOC standard in all wells; well 3S contained the greatest variety of organics, as well as the highest total concentration at 69,472 ppb (Table VII).

July 24, 1986: MW 1 through 9D (a total of 11 wells) were sampled. Of the 11 samples, all (unfiltered) were analyzed for metals and pesticides and 9 were analyzed for VOC's. (Wells MW 1 and 2 were not analyzed for VOC's).

The results for lead and pesticides in all wells were ND. Arsenic results ranged from <10 to 880 ppb and exceeded standards in 3 wells: 3S, 3D and 5. Cadmium levels ranged from <10 to 32 ppb and exceeded standards in 3 wells: 1, 5 and 9D. Only MW 2 did not exceed standards for any metal. Comparing metals levels for the 7 wells tested in both 1983 and 1986: arsenic and cadmium were generally lower in 1986 results; mercury was higher in 4 of the 1986 tests.

Of the 9 samples (MW 3S through 9D) analyzed for VOC's, standards were exceeded for Total VOC's in 6 wells: 3S, 3D, 5, 6, 7 and 8. Wells 4 and 9D, although not exceeding Total VOC standards, contained benzene and chloroform, respectively (Table VIII). The greatest variety and concentration of VOC's was again found in MW 3S (as in the October 1983 test results) with 10,726 ppb. In comparing VOC levels for the 5 wells tested in both 1983 and 1986, the 1986 results appear much lower. However, in the 1986 tests the wells were pumped dry and allowed to remain up to 48 hours before sampling; therefore, volatilization may have occurred, lowering concentrations prior to sampling (compare Tables VII and VIII).

DRAI Testing

October 15 and 16, 1986: The monitoring wells were resampled with DRAI personnel present to ensure that NJDEP protocol was followed. In this instance, all water samples for metal analysis were filtered. Samples for volatile organic analysis were collected within two hours after evacuation of the wells, except for the repeat sampling of wells 3S and 3D, where the second sampling occurred 24 hours after pumping. Of 16 samples, 15 were analyzed for metals and 15 for VOC's (3SB, duplicate of 3SA, was not analyzed for metals; 3DB, duplicate of 3DA, was not analyzed for VOC's).

Arsenic levels ranged from <10 to 3,040 ppb, exceeding standards in 7 of the 15 samples: 3S-R, 3D-R, 5, 6, 7A, 7B and 8. Cadmium levels were measured at <5 ppb for all samples, and mercury levels were measured <.5 ppb for all samples. Due to the high levels of arsenic, the 7 wells exceeding standards were resampled. The 7A sample was insufficient for analysis, but the remaining 6 samples confirmed the previous results, with a high of 3,920 ppb at MW 5 and an increase from 1,630 to 3,250 ppb at MW 8. Thus, soluable cadmium and mercury are not detected in significant amounts in these filtered samples, but arsenic readings exceed all results to date (Table IX).

Total VOC levels ranged from ND to 3,400,000 ppb; levels exceeded standards in 8 of the 15 samples (Table IX). Again, Well MW 3S had the highest total concentration, found in one of its duplicate samples. (Its other duplicate of October 15 was 807,000 ppb and its resample on October 16 was 568,900 ppb. The MW 3S analytical results demonstrate the fluctuations which can be expected, both in constituents and concentrations, when dealing with volatile organic contaminants at the site).

January 13 and 14, 1987: DRAI personnel again sampled the monitoring wells in accordance with NJDEP quarterly sampling requirements. Thirteen samples were analyzed for metals and VOC's, and 7 samples were analyzed for pesticides in accordance with NJDEP requirements. (MW 1,2,4,7 and 9 were not analyzed for pesticides).

Arsenic levels ranged from ND to 4,300 ppb; standards were exceeded in 6 samples at 4 wells: 3D, 3S (A&B), 5 (A&B) and 7 (Table X). (Arsenic was found in field and trip blanks, but not at levels sufficient to invalidate results.) Cadmium and mercury levels were non-detectable in all samples. Comparison of the October 1983, July 1986 (unfiltered) and October 1986, January 1987 (filtered) results indicates that arsenic levels are increasing greatly in the MW 3S and 3D area and remaining high (with fluctuation) in the MW 5 area. There also seems to be an increase of arsenic in the region of MW 7.

Volatile organics ranged from ND to 254,900 ppb; levels exceeded standards in 8 samples at 6 wells: 3S (A&B), 3D, 4, 5 (A&B), 6 and 7. Wells 1 and 2 were not analyzed for VOC's. Well 8, while not exceeding Total VOC standards, contained 11 ppb carbon tetrachloride. There was a large decrease in VOC concentrations when compared with the October 1986 results, with the exception of MW 5 (See Tables IX and X).

Pesticides were detected in ground water for the first time. Levels in the 7 samples analyzed ranged from ND to 5,500 ppb. The herbicide 2,4-D was most prevelant, with highest concentrations in samples from Wells MW 3S, 3D and 5.

4.4.2 Production Well

At the request of the Franklin Township Health Department, Cleary has been sampling its own production well since 1981. This well was used for process and irrigation purposes. The production well is sampled regularly for arsenic, cadmium and mercury and, since 1984, has been sampled for barium, chromium, lead, selenium and silver as well.

Results of sampling of the new production well since February, 1985, indicate that the well water conforms with the ground water quality criteria for Class GW2 for those parameters for which analysis was conducted (Table IX). Before that time, however, arsenic, cadmium and mercury occasionally exceeded ground water quality limits of 50 ppb, 10 ppb and 2 ppb, respectively. Volatile organic chemicals were detected only once, when 37 ppb of chloroform were found in the sampling of December 4, 1984. No VOC's have been found since that time.

4.5 Aquifer Characteristics

4.5.1 Testing

Methodology. A pump test was conducted in November, 1986, to estimate the aquifer characteristics for both the shallow and deep portions of the Brunswick aquifer that are penetrated by the wells at the Cleary site.

The production well was idle for 96 hours prior to the pump test to allow aquifer conditions to reach equilibrium. The production well was then pumped at a steady 24 gallons per minute (gpm) for the duration of the 48-hour pump test. Aquifer recharge nearly equalled the pumping rate by the end of the test. Water levels in the monitoring wells and the old production well were recorded by use of hand-held water level indicators, while Stevens Type F continuous water level recorders were mounted on monitoring wells 3S and 3D (Figures 9 through 12). The compiled data and the curves plotted to determine the formation constants are included as Appendices D and E.

Results. There are significant differences in ground water elevations between the shallow and deep monitoring wells (Figures 9 and 11), with the differences increasing during pumping of the production well. The smallest hydraulic head differences are recorded between water levels in wells 9S and 9D, with 9S having a water level approximately 5.6 feet higher than 9D, both before and during pumping. The differences show the greatest increase in a direction southeast from wells 9S and 9D, towards the area of water mounding, centered near shallow monitoring wells 5, 6 and 7. Under static conditions, monitoring wells 5, 6 and 7 have water levels of approximately 18.0, 16.6 and 18.0 feet higher, respectively, than deep water levels (Figures 9 and 11). However, during the pumping test, these differences increased to 20.9, 18.3 and 20.2 feet, respectively (Figures 10 and 12).

The hydraulic head difference near monitoring well 8 is estimated to be approximately 25 feet.

The nature of open-hole, fractured rock wells does not allow exact calculation of the vertical hydraulic gradient; but using measured elevations and known thicknesses separating the open-holes in wells 3S and 3D, the gradient was about 0.19 foot/foot before pumping, and 0.28 foot/foot after pumping the production well. The gradients would be even larger for wells 5, 6, 7 and 8. The hydraulic head difference between wells 9S and 9D is maintained, even though casing depths are about the same.

Due to the occurrence of a low-permeability layer in its upper portion, the Brunswick Shale is considered a semi-confined aquifer at the Cleary site. The low permeability of the upper portion of the Brunswick aquifer is such that, for practical purposes, it contributed very little water to the lower Brunswick aquifer under equilibrium or pumping conditions.

Aquifer coefficients (transmissivity, storativity and leakage) could be determined only for monitoring wells 3D and 8 and the old production well because only these wells responded during the pump test. Water levels in the other wells were otherwise stable or actually increased during the pump test, probably in response to recent rainfall. Aquifer characteristics did not vary appreciably at the various well locations, but are greatest at the old production well. Well 3D was determined to have the lowest transmissivity. This well has been known to pump dry quickly.

A variety of pump test analysis methods were employed, including the Jacob, Hantush-Jacob, Hantush I and Residual Drawdown methods (Appendix E and Table XII). It is not uncommon to have aquifer storativity vary by an order of magnitude when using different methods of analysis. Thus, an average storativity must be calculated, which, in this instance, is about 0.005, indicating semi-confined conditions. Results of aquifer testing are shown in Table XII.

4.5.2 Horizontal Movement

The ground water surface configurations for the shallow and deep portions of the aquifer were plotted using water level measurements taken just before and at the end of the pump test (Figures 9 through 12). Shallow wells are defined as those either unaffected by pumping or completed to a depth of fifty feet or less. The deep wells include the present production well, the old production well, and monitoring wells 3D, 8 and 9D. The maps are presented on Figures 9 through 12.

Shallow Aquifer.

The ground water flow direction in the shallow portion of the aquifer is predominantly to the northwest, in the direction of wells 9S and 9D. The flow direction is toward the generally decreasing topographic elevation, with the gradient being 0.077 to 0.028 foot/foot. However, the flow also appears to be somewhat radial, with a high just south of the agricultural chemical plant. Since the top foot of soil was removed in and around the old chemical lagoon and agricultural chemical building in September 1986,

topographic low areas have collected and been infiltrated with rainfall that might normally have left the site as runoff. In addition, the porous concrete blocks of the production well pond (fire pond) also leak water at a relatively constant rate. The hydraulic gradient resulting from rainfall infiltration and leakage from the production well pore could account for the radial flow of ground water away from the area of soil removal.

Deep Aquifer.

The natural ground water flow (non-pumping conditions) in the deep wells is in a westerly direction as shown in Figure 11. Thus, the flow directions in the shallow and deep Brunswick Shale are nearly aligned under natural conditions, with an average gradient of about 0.0075 foot/foot. By the end of the pump test, the gradient was reversed near the pumping well such that the water levels indicate an easterly flow direction. The placement of the 90-foot contour line augments the fact that both drawdown and transmissivity are greater for monitoring well 8 than for monitoring well 3D. Even though MW8 is at the greater distance from the pumping well, it is more nearly aligned with the production well in the direction of geologic strike.

The Brunswick Shale is everywhere anisotropic and known to have a greater hydraulic conductivity in the direction of strike (Vecchioli et al., 1969). This may explain the relative lack of pollution in the production well because: (1) it is preferentially drawing water in a direction away from the old chemical lagoon and chemical plant area, and (2) the pump, at a depth of approximately 215 feet, may be preferentially drawing water from a horizontally-oriented system due to the greater horizontal permeability.

4.5.3 Vertical Movement

Analysis of the site geology and results of the pumping test indicates that vertical hydraulic conductivity is essentially regulated by the amount of low permeability clay present in fractures at shallower depths, the anisotropy introduced by a layered shale, and the amount of fracturing at any particular location. The net effect is that vertical hydraulic conductivity and, thus, downward vertical migration of ground water will increase with depth at the Cleary site, especially where the hydraulic gradient is large. The existence of such gradients indicates the potential for ground water contaminant movement in a downward vertical direction.

The vertical conductivity of the semi-confining layer is tabulated in Table XII. The shallow wells are all completed in the upper portion of the fractured rock, and transmissivities vary from one well location to another.

4.6 Ground Water Contaminant Migration

The relative migration rate of metals and organic compounds in ground water is a function of their solubility in water, their ionic static density and the exchange properties of the aquifer material. Contaminants found in the ground water at the Cleary site are largely contained within the overburden, the vadose zone of fractured shale above the water table, and the relatively shallow ground water. These three zones appear to have generally low permeability, due to high silt and clay content of the soils.

The neutral pH of the ground water does not aid in metals mobilization. In the fractured rock environment, however, the attenuation of contaminants may be minimal, due to the relatively small surface area of the fractures.

The anticipated horizontal migrational direction of any contaminants entering the shallow aquifers would be to the northwest. Under natural flow conditions contaminants entering the deeper aquifer would be expected to migrate to the west.

4.6.1 Shallow Aquifer

Well MW1 - Total Depth 30.4 feet. Located on the golf course at the eastern pump of the ditch, this well shows no significant levels of contaminants. This well would reflect contamination from the golf course and food processing plant.

Well MW 2 - Total Depth 46 feet. Located east of the pond at the western tip of the ditch, this well also showed no significant levels of contaminants. This well would also reflect contamination from the golf course and food processing plant.

Well MW 3S - Total Depth 31.4 feet. Located just east of the old chemical lagoon, this area shows high but fluctuating levels of arsenic (<10 to 1300 ppb); pesticides up to 5,500 ppb; and VOC levels as high as 568,900 ppb, including benzene, chloroform and carbon tetrachloride. This may be the result of: leakage from the old lagoon, indicating an eastward migration of groundwater contaminants; the downward migration of overflow contaminants; or the disposal of laboratory chemicals into the septic system, the leach field of which is adjacent to this well.

Well MW 4 - Total Depth 59.7 feet. Located just north of the old chemical lagoon, this area shows some arsenic contamination (27 ppb) and VOC's ranging from 19 to 265 ppb, including benzene, chloroform and carbon tetrachloride. The lagoon is also the probable source, through northward migration of contaminated groundwater under the lagoon or downward migration of overflow contaminants.

Well MW 5 - Total Depth 32 feet. Located southwest of the old chemical lagoon, this area has high levels of arsenic (up to 4300 ppb) and VOC's, including benzene. Dieldrin and 2, 4-D are also present in recent samples, the 2, 4-D as high as 2000 ppb. Mercury and cadmium were present in unfiltered samples, but are non-detectable in filtered water. The lagoon is the logical source of contamination.

Well MW 6 - Total Depth 32.6 feet. Also southwest of the lagoon, but more distant than MW-5, this area showed arsenic levels of <10 to 1190 ppb and VOC's as high as 820,000 ppb, including benzene. Pesticides recently appeared in the form of 40 ppb of 2, 4-D. Possible sources include: vertical migration of lagoon overflow; southwesterly flow of groundwater contaminants; westerly flow of still contaminants; ground spills or discharges.

Well MW 7 - Total Depth 35.2 feet. Located west of the still and southwest of the old lagoon, this area shows arsenic levels up to 910 ppb and VOC's as high as 200,000 ppb, including benzene. Arsenic levels appear to be increasing. The still is the most likely source, but there may also have been spills.

Well MW 9S - Total Depth 60.7 feet. Located west of the facilities, this well showed no significant level of contaminants in filtered samples. The non-filitered July 1986 sample contained 35 ppb mercury. This well is in a downgradient location, about 400 feet northwest of the old lagoon.

4.6.2 Deep Aquifer

Well MW 3D - Total Depth 121.8 feet. Contamination by arsenic, volatile organics and, recently, pesticides has been detected. This indicates pollution of the groundwater area north east of the old chemical lagoon and west of the Food Additive Building. Based on the concentrations of similar substances in the shallow aquifer at well MW 3S, it would appear that downward vertical migration of contaminants is occurring. These contaminants may have migrated from contaminated soils which exist directly above the groundwater, as arsenic levels in soils samples from that area are high. It is also possible that leaks from the old chemical lagoon are responsible for this contamination:

Well MW 9D - Total Depth 100.9 feet. Based on filtered sample results this area appears clean. Unfiltered samples in July of 1986 showed metals contamination. Low levels of chloroform were also detected at that time. This well is in a downgradient location, about 400 feet northwest of the old chemical lagoon.

Well MW 8 - Total Depth 72.1 feet. Although only 72 feet total depth, this well is included with the deep aquifer discussion. This area south of the still showed large fluctuations in arsenic levels, ranging from 5.6 to 3250 ppb in filtered samples. Benzene was also present at 51 ppb. Elevated levels of arsenic in all depths of soil samples from the still area indicate this is a possible source of the arsenic contamination. However, the groundwater flow would have to be southerly. The contamination may have resulted from spills or overflows.

New Production Well - Total Depth 355 feet. Previous findings of contaminants indicated arsenic, cadmium, mercury and chloroform were entering the groundwater east of the Food additive building. No VOC's have been detected recently, but arsenic is present within guideline levels using a filtered sample. Since pumping test results indicated the potential to reverse flow direction in the lower aquifer, it is possible that these contaminants were migrating from the old lagoon area.

Old Production Well - Total Depth 155 feet

Analytical results from 1981 and 1982 indicate the presence of arsenic, cadmium and mercury at generally low levels. The source is probably the old lagoon area.

General trends in the severity of pollution at the site and contaminant sources and migration patterns can be confirmed only through additional samplings and analysis.

ATTACHMENT A

5.0 FINDINGS AND RECOMMENDATIONS

5.1 Findings

5.1.1 Soils

(1) Arsenic, Cadmium and Mercury concentrations in soils in the vicinity of the manufacturing plant are high, particularly in and near the former chemical lagoon and chemical production building. Soils within the drainage patterns of these facilities have also been contaminated, probably as the result of overflows.

(2) Based on limited soil sampling that has been conducted for volatile organic compounds (VOC's) and pesticides, no organic contamination of the soils was found. These samples were taken at various depths and were preferentially targeted to areas with high metal concentrations.

(3) Sampling results did not reflect a consistent pattern of metal contaminant decrease with depth, although that pattern does predominate.

(4) The cation exchange capacity of the soils appears to be exceeded, as contaminants are present near bedrock and in ground water. It is possible, however, that lagoon seepage rather than overflow may have been responsible for some of the lower-depth contamination.

(5) Soil results from samples taken closest to the southern boundary of the site indicate generally low or non-detectable levels for most parameters. However, mercury was present above action levels in several of the samples.

(6) Based on soil sampling results (WAC 70, 1-4 feet and WAC 91, 4-8 feet) down slope of the still, it appears that this location coincides with an area of former persistent spills or disposal.

5.1.2 Ground Water

(1) Seven (7) of the monitoring wells (MW 3S, 3D, 4, 5, 6, 7 and 8) have exhibited varying levels of organic chemicals. All except MW 8 exceed standards for total VOC's. (MW 8, while not exceeding standards, contained carbon tetrachloride). Highest VOC concentrations are in monitoring wells 3S, 3D, 5, 6 and 7. VOC contamination in wells 3S and 3D may be the result of the operation of the former chemical lagoon and the leach field. Contamination in wells 4 and 5 could also be the result of leakage through the old chemical lagoon. Contamination in wells 6, 7 and 8 may be the result of discharges or spills in the vicinity of the chemical plant building.

(2) Volatile organic contamination is generally confined to the more-shallow Brunswick Shale. Deep monitoring well 3D has, approximately, a 10- to 1,000-fold reduction in VOC's when compared with shallow monitoring well

3S. Since shallow monitoring well 3S has had the highest level of organic contamination at 3,400 ppm, while deep well 3D had only about 1 ppm, it appears that a very large attenuation of organic chemicals is taking place.

(3) Principal VOC contaminants have varied widely in the past, ranging form methyl tert-butyl ether and trichloroethylene to dibromochloroethane, carbon tetrachloride and benzene. In the most recent sampling, however, carbon tetrachloride and benzene were the principal contaminants. The lack of continuity, either in chemicals or concentrations, is due, in part, to the variety of contaminants discharged to ground water and the methods of analysis employed by the different laboratories doing the testing.

(4) Levels above drinking water standards of dissolved arsenic are found in the ground water. Despite some previous high levels of total mercury and cadmium, dissolved levels of these metals meet standards.

(5) Arsenic levels appear to be increasing in the wells MW 3S and MW 3D and well MW 7. Arsenic levels in well MW 5 are fluctuating.

(6) The most recent (January 1987) sampling results indicate levels of pesticides up to 5,500 ppb in shallow well MW 3S. Pesticides are also present in deep well MW 3D at 1,600 ppb. Highest concentrations are below the former chemical lagoon and appear, in significantly decreasing levels, in a westward direction consistent with ground water flow.

(7) The plant production well presently meets standards for the parameters analyzed. The old production well was not potable when last tested in 1981 due to high concentrations of arsenic and cadmium. However, water samples were not filtered prior to sample acidification.

(8) Volatile organic chemicals have been detected in the plant production well only once, when 37 ppb of chloroform were found in samples taken on December 4, 1984. As samples were normally obtained from the production well head, it is unlikely that aeration accounts for the lack of volatile organic chemicals.

(9) Analysis of water levels in the monitoring wells indicates that ground water flow in the shallow Brunswick Shale ranges from north to west, with perhaps the largest component of flow being in a northwesterly direction. Most contaminants are contained within the shallow Brunswick Shale and will travel in the direction of ground water flow. It should be noted that ground water flow in the shallow Brunswick Shale is not affected by pumping the production well, as is flow in the deeper Brunswick Shale which locally reverses direction from west to east upon pumping of the production well.

(10) If fracturing is present under the old chemical lagoon and leakage from the lagoon occurred, pumping of the production wells, which reversed flow in the lower aquifer, may have drawn these lagoon contaminants into these wells.

(11) The head difference between the shallow and deep aquifers around the old chemical lagoon and agricultural chemical building is about 16 feet before pumping and 19 feet after pumping the production well. The transport mechanism of contaminated ground water from the shallow to the deep aquifer is, therefore, through direct recharge.

5.1.3 Surface Water

(1) The food additive section presently discharges washdown wastewater through an underground tank into a bentonite-lined lagoon, then into an unlined lagoon, from which it discharges into the local creek. The pond and creek waters have not been tested for contamination in this study.

(2) Samples taken in 1981 in the effluent ditch (creek) indicated soluable levels of arsenic at <20 ppb, mercury at <2 ppb and cadmium at <10 ppb.

5.1.4 Remediation

(1) Cleary has removed contaminated wastewater, sludge and soil from the old chemical lagoon and contaminated soil to a depth of one foot from outside the lagoon in a preliminary effort toward remediation of contamination, as required by the NJDEP's ACO.

(2) Additional soil removal is necessary to meet NJDEP action levels.

(3) Any ground water remediation system will have to handle VOC, pesticide and metal contamination.

5.2 Recommendations

5.2.1 Soils

(1) Additional sampling of the site soils, at several depths, must be conducted to determine both the vertical and horizontal distribution of contaminants.

(2) All samples should be analyzed for the three metals. However, due to the variety of potential contaminants present, a limited number of samples will also be analyzed for PP+40 and herbicides.

5.2.2 Ground Water

(1) Two additional clusters of monitoring wells are recommended to eliminate gaps in the monitoring network. One set of monitoring wells should be located west of monitoring well 6 to ascertain the extent of contamination leaving the Cleary property. Deep monitoring well 10D was installed on March 27, 1987 and developed during the first week of April, for this purpose. Another set of wells should be located several hundred feet north of monitoring wells 3S and 3D, in an area accessible by a

drilling rig, to ascertain the extent of contaminants flow in a northerly direction.

(2) Quarterly analyses of ground water samples from the monitoring wells is required by the present NJPDES/DGW permit. Care should be taken to ensure that samples are properly collected, chain of custody maintained and analyses performed in an acceptable manner.

(3) Due to the variety of chemicals used, stored, and produced on the site, PP+40 and herbicides testing is recommended for wells MW 3S and MW 3D.

(4) Sampling and analysis for pesticides and herbicides is recommended at monitoring wells 9S and 9D and the production well to aid in delineating the northwesterly and easterly extent of these parameters in the aquifer.

5.2.3 Surface Water

Surface waters in the lagoons should be sampled for PP + 40. Any contaminants identified should than be monitored on a regular basis.

5.2.4 Remediation

(1) All future soil removal should be carried out according to ECRA requirements for sampling, removal, post-removal sampling, storage and disposal.

(2) Areas must be backfilled with certified clean soil.

(3) All activities must be fully documented.

(4) Ground water remediation must take place due to the severity of the contamination. When the extent of ground water contamination is properly delineated, DRAI will submit plans for remediation of contamination, subject to NJDEP approval.

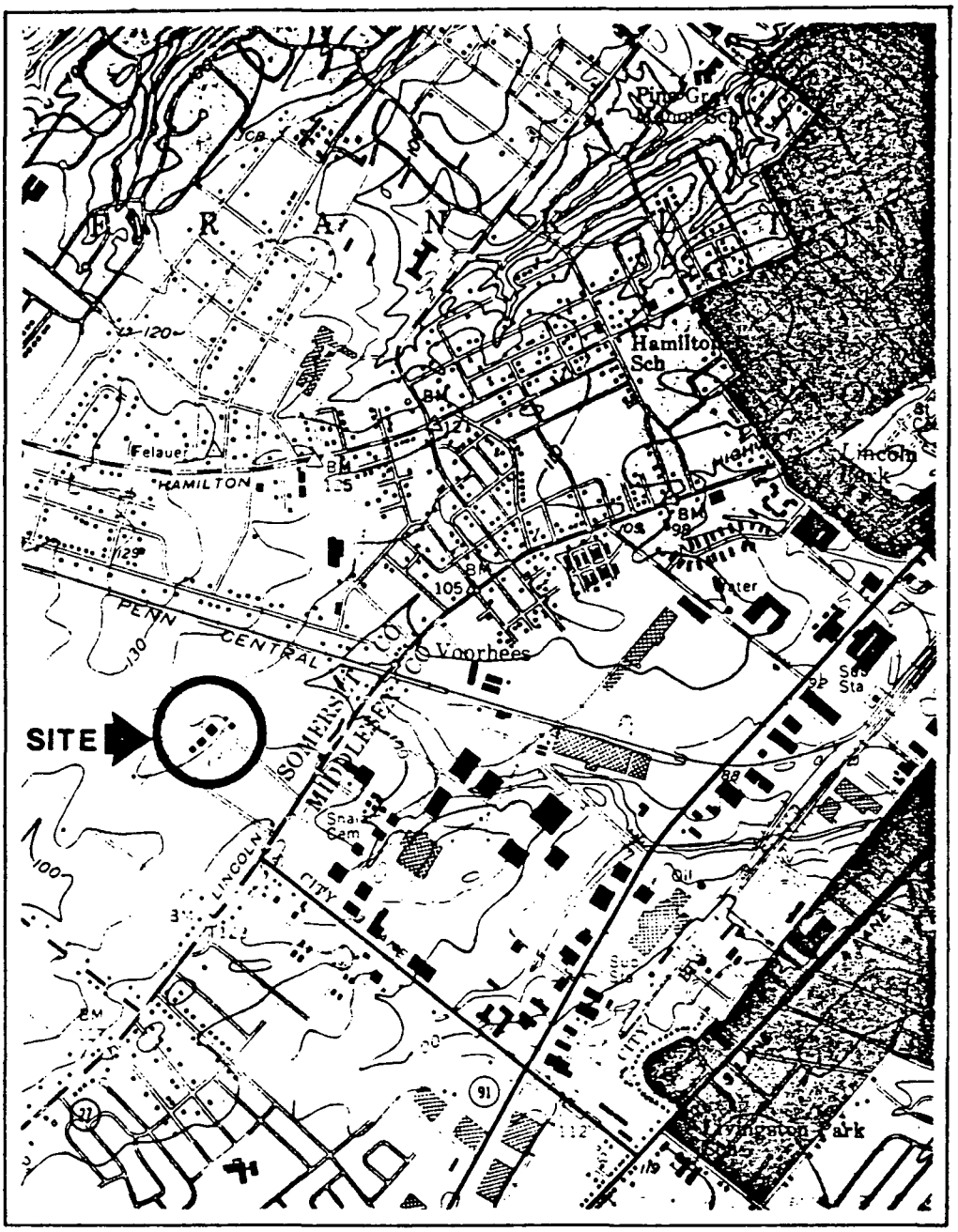
6.0 REFERENCES

Vecchioli. J., 1967. "Directional Hydraulic Behavior of a Fractured Shale Aquifer in New York". In: International Sumposium on Hydrology of Fractured Rocks. Yugoslavia, 1965. Proc. Internat. Assoc. Sci. Hydrology, Pub 73, vol. 1. pp. 318-326.

Vecchioli, J., Carswell, L.D., and Kasabach, H.F., 1969. "Occurrence and Movement of Ground Water in the Brunswick Shale at a Sited Near Trenton, New Jersey." U.S. Geological Survey Professional Paper 650-B. B154-157.

FIGURES

ATTACHMENT A



NEW BRUNSWICK QUADRANGLE
7.5 MINUTE SERIES

0 2000'

APPROXIMATE SCALE

N

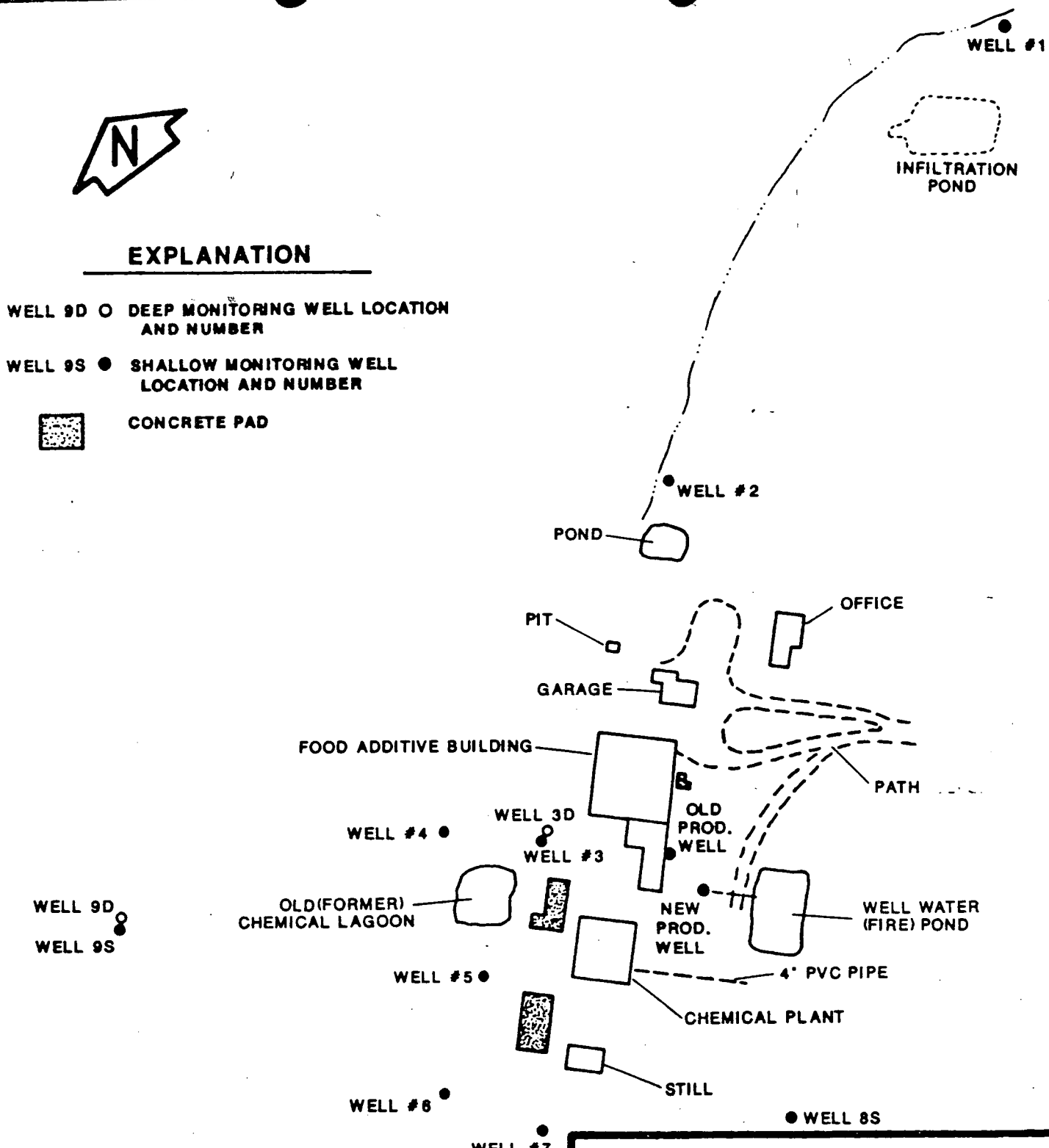
Dan Raviv Associates, Inc.
5 Central Avenue, West Orange, NJ 07052

SITE LOCALITY

W.A CLEARY CHEM. CO. - SOMERSET, NJ.

Prepared By EPR/ODL	Date DECEMBER 1986
Job No. 86C366	Figure 1

ATTACHMENT A



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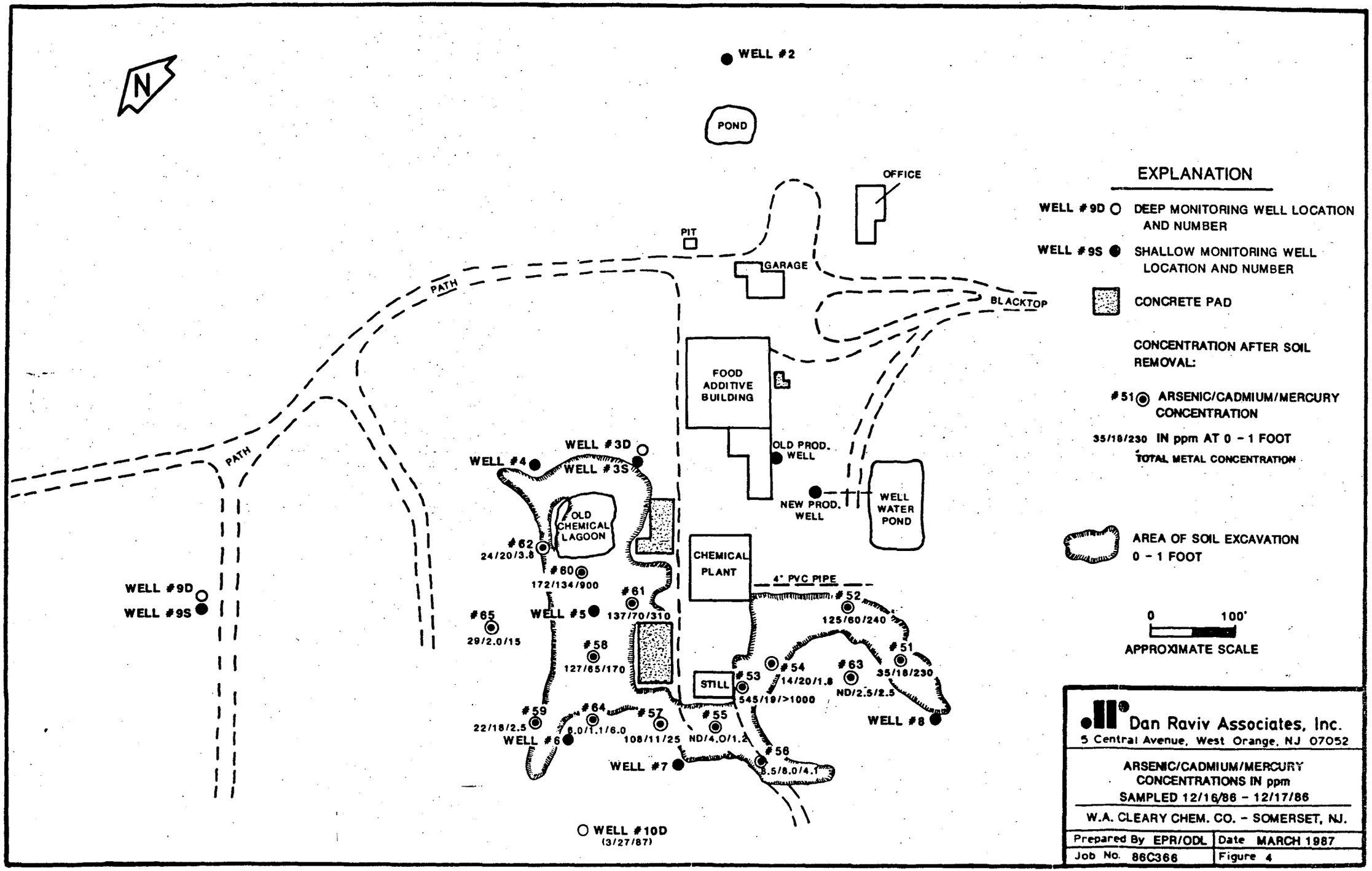
MONITORING WELL LOCATIONS

W.A. CLEARY CHEM. CO. – SOMERSET, NJ.

Prepared By EPR/JAL	Date DECEMBER 1986
Job No. 86C366	Figure 2

ATTACHMENT A



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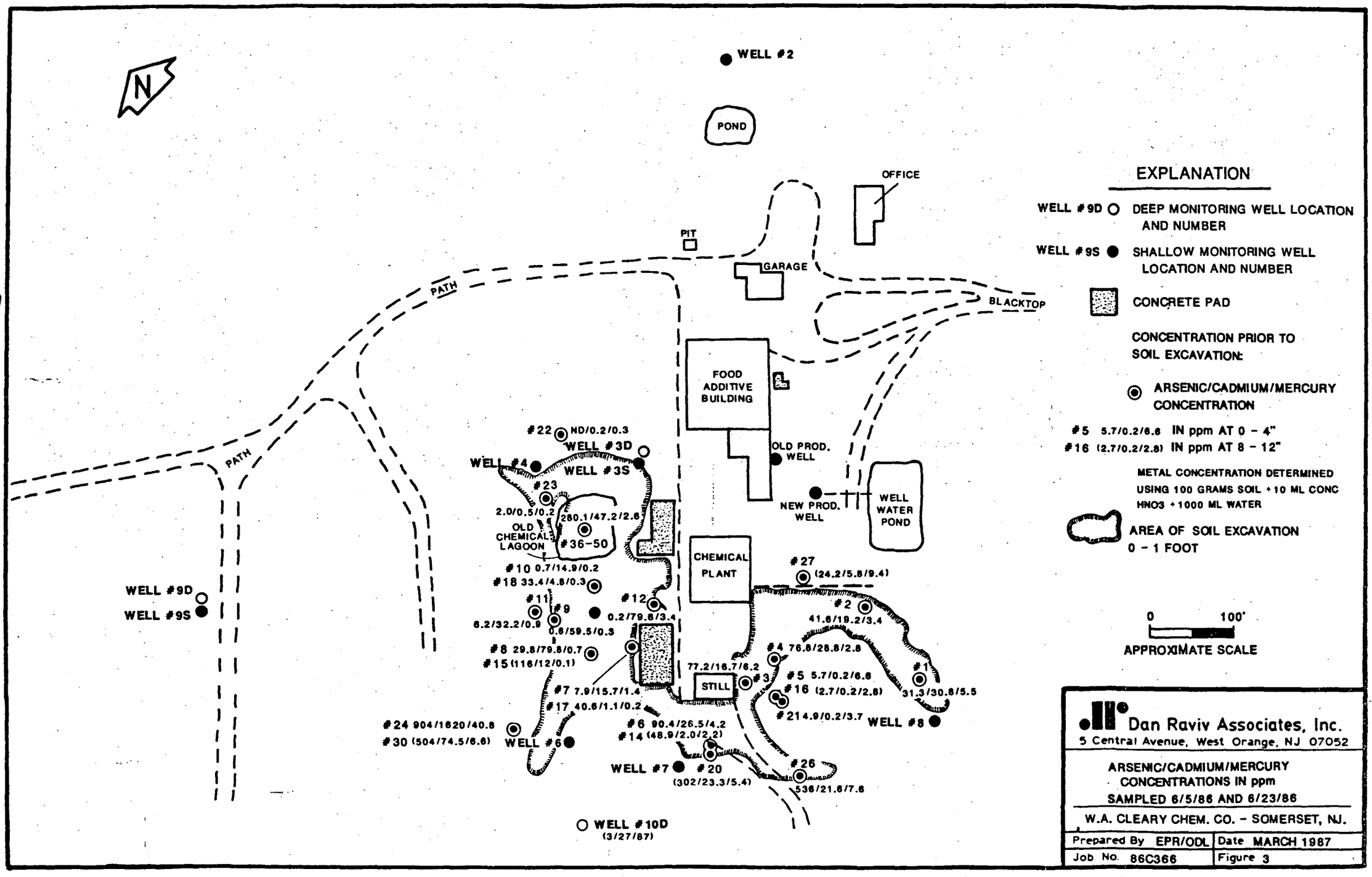
ARSENIC/CADMIUM/MERCURY CONCENTRATIONS IN ppm
SAMPLED 12/16/86 - 12/17/86

W.A. CLEARY CHEM. CO. - SOMERSET, NJ.

Prepared By EPR/ODL	Date MARCH 1987
Job No. 86C366	Figure 4



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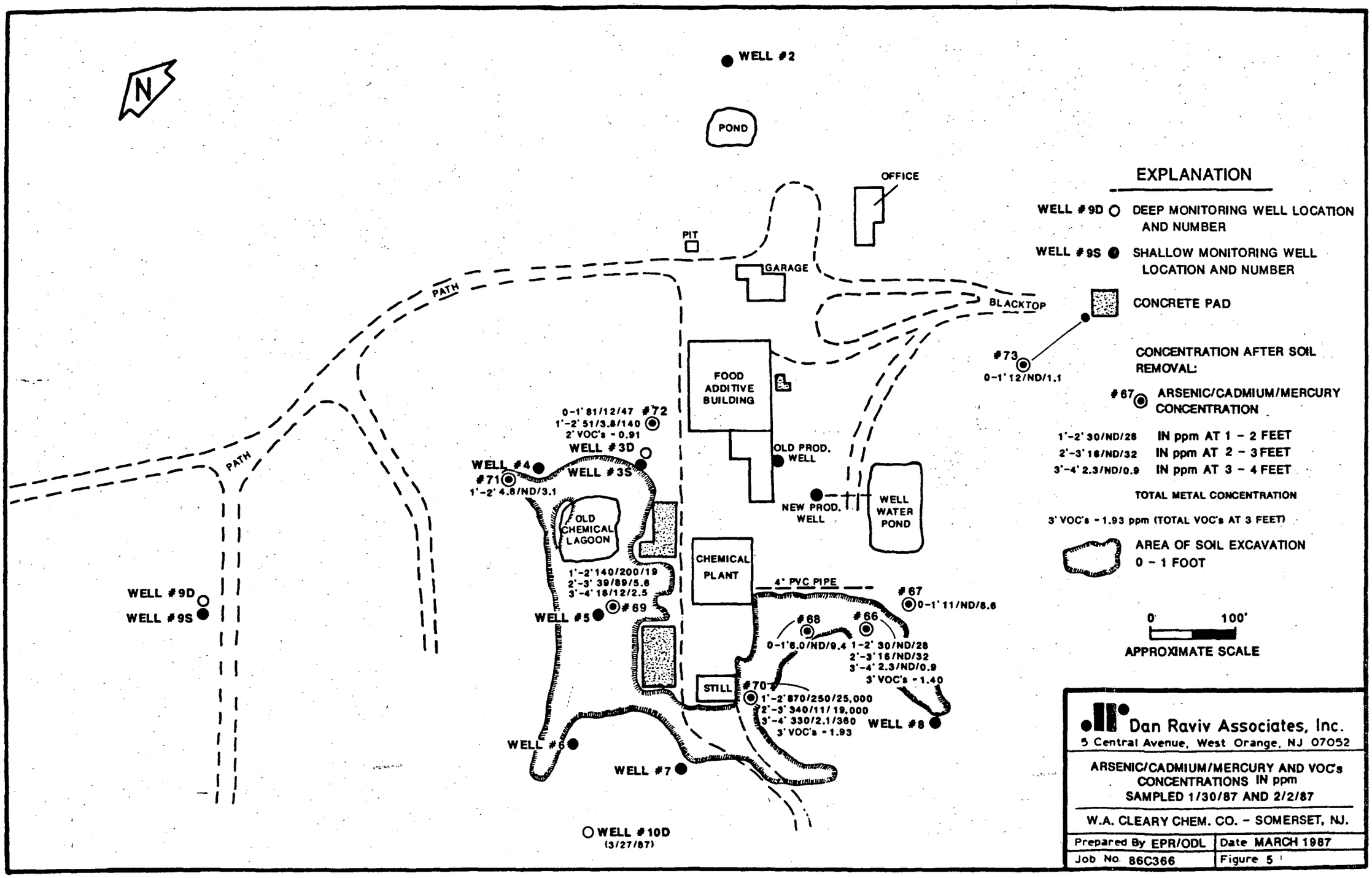
ARSENIC/CADMIUM/MERCURY CONCENTRATIONS IN ppm
SAMPLED 6/5/86 AND 6/23/86

W.A. CLEARY CHEM. CO. - SOMERSET, NJ.

Prepared By EPR/ODL	Date MARCH 1987
Job No. 86C366	Figure 3



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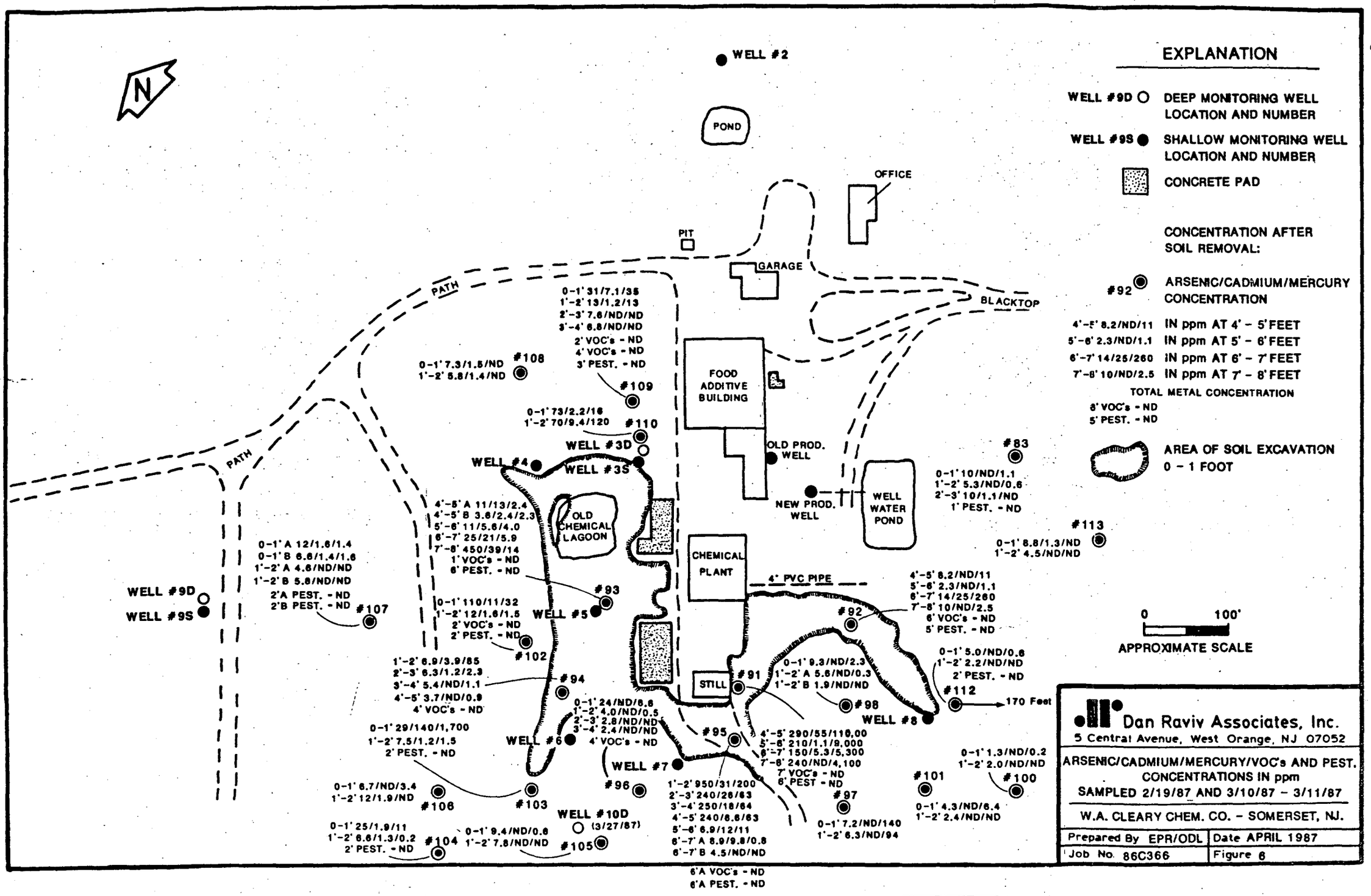
ARSENIC/CADMIUM/MERCURY AND VOC's CONCENTRATIONS IN ppm
SAMPLED 1/30/87 AND 2/2/87

W.A. CLEARY CHEM. CO. - SOMERSET, NJ.

Prepared By EPR/ODL	Date MARCH 1987
Job No. 86C366	Figure 5



EXPLANATION

WELL #9D ○ DEEP MONITORING WELL LOCATION AND NUMBER

WELL #9S ● SHALLOW MONITORING WELL LOCATION AND NUMBER

CONCRETE PAD

CONCENTRATION AFTER SOIL REMOVAL:

#92 ARSENIC/CADMIUM/MERCURY CONCENTRATION

4'-5' 8.2/ND/11 IN ppm AT 4' - 5' FEET
5'-6' 2.3/ND/1.1 IN ppm AT 5' - 6' FEET
6'-7' 14/25/260 IN ppm AT 6' - 7' FEET
7'-8' 10/ND/2.5 IN ppm AT 7' - 8' FEET

TOTAL METAL CONCENTRATION
8' VOC's - ND
5' PEST. - ND

AREA OF SOIL EXCAVATION
0 - 1 FOOT

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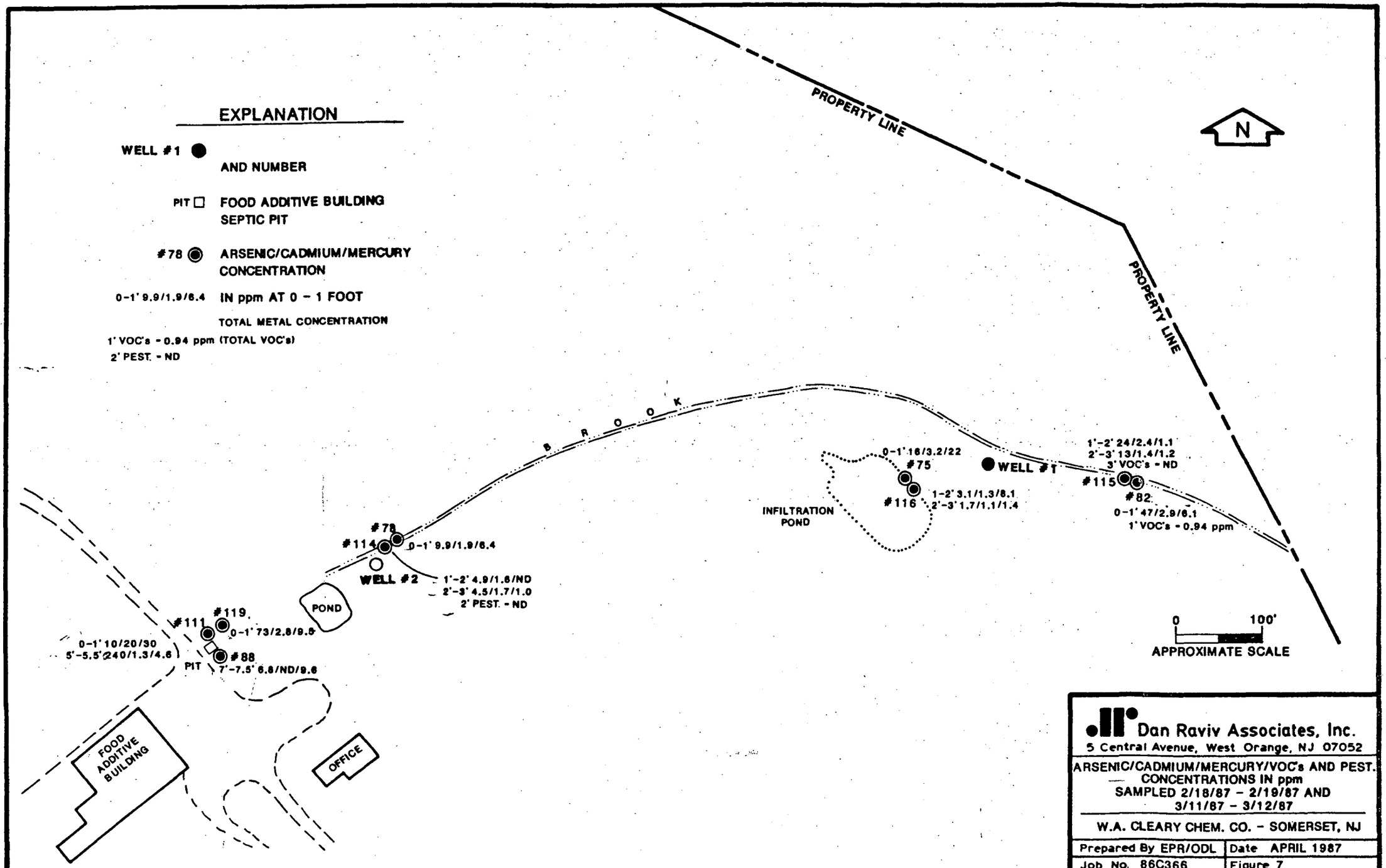
ARSENIC/CADMIUM/MERCURY/VOC's AND PEST. CONCENTRATIONS IN ppm
SAMPLED 2/19/87 AND 3/10/87 - 3/11/87

W.A. CLEARY CHEM. CO. - SOMERSET, NJ.

Prepared By EPR/ODL	Date APRIL 1987
Job No. 86C366	Figure 6



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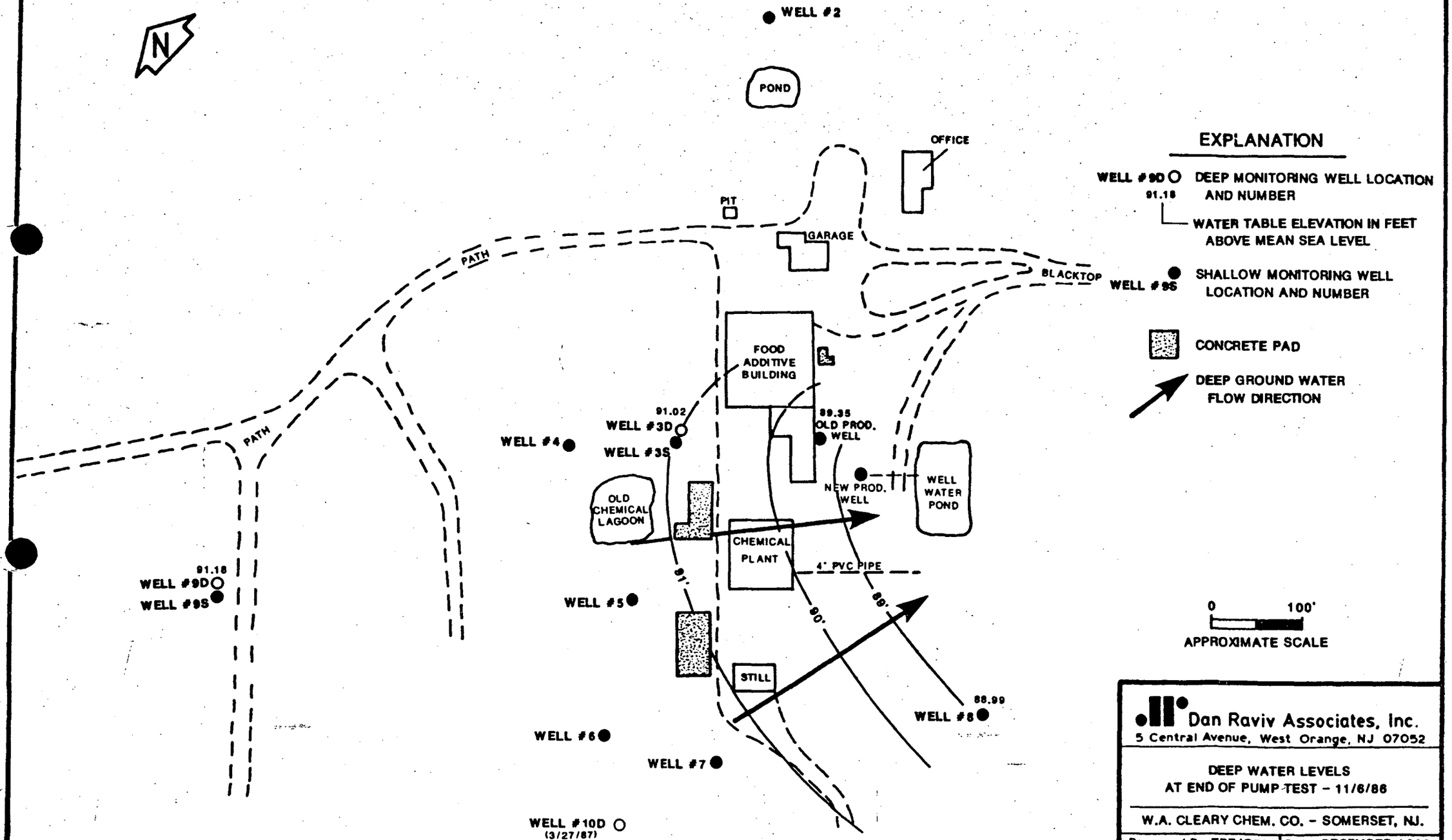
5 Central Avenue, West Orange, NJ 07052

ARSENIC/CADMIUM/MERCURY/VOC's AND PEST. CONCENTRATIONS IN ppm
SAMPLED 2/18/87 - 2/19/87 AND 3/11/87 - 3/12/87

W.A. CLEARY CHEM. CO. - SOMERSET, NJ

Prepared By EPR/ODL	Date APRIL 1987
Job No. 86C366	Figure 7



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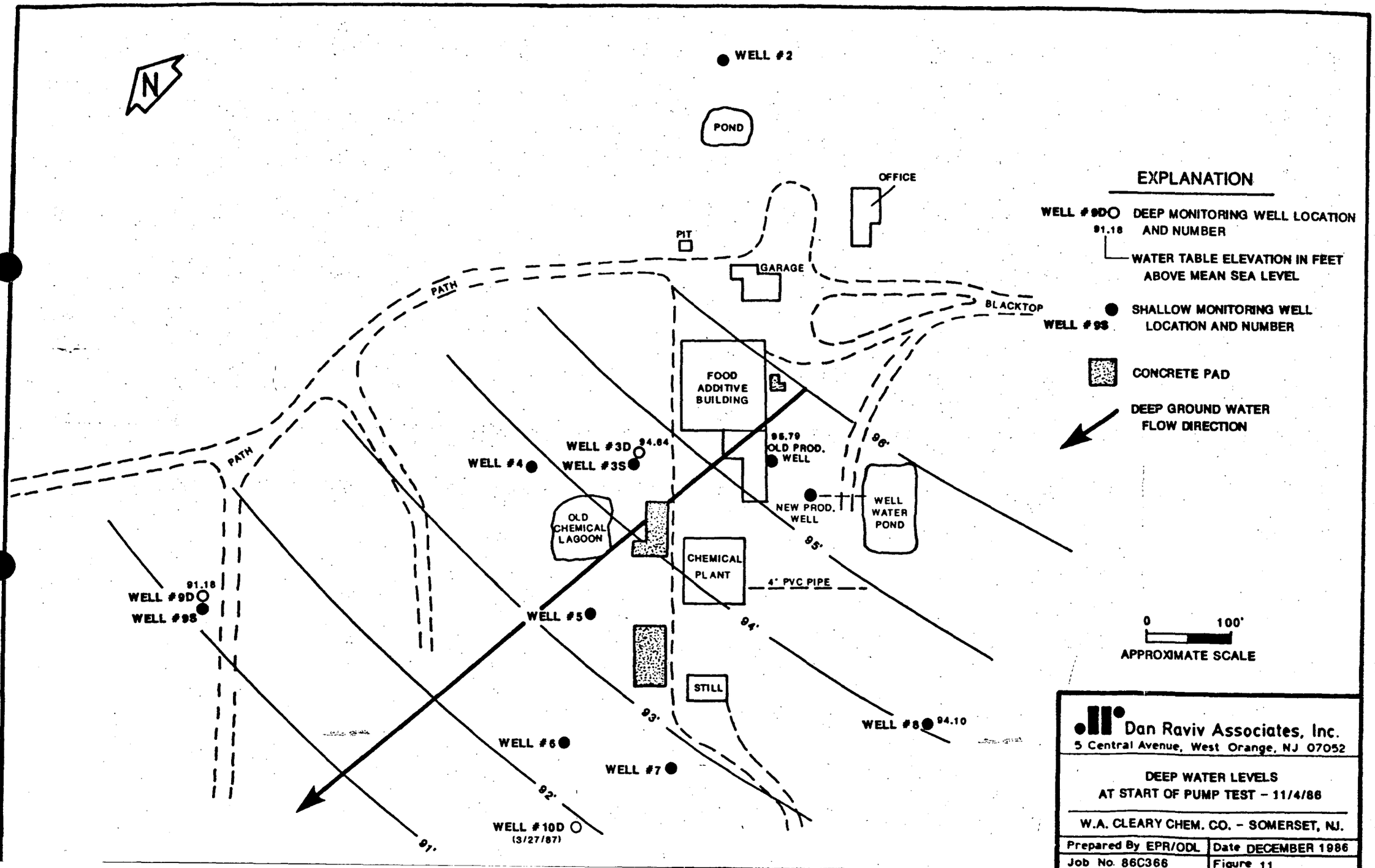
DEEP WATER LEVELS AT END OF PUMP TEST – 11/6/86

W.A. CLEARY CHEM. CO. – SOMERSET, NJ.

Prepared By EPR/ODL	Date DECEMBER 1986
Job No. 86C366	Figure 12



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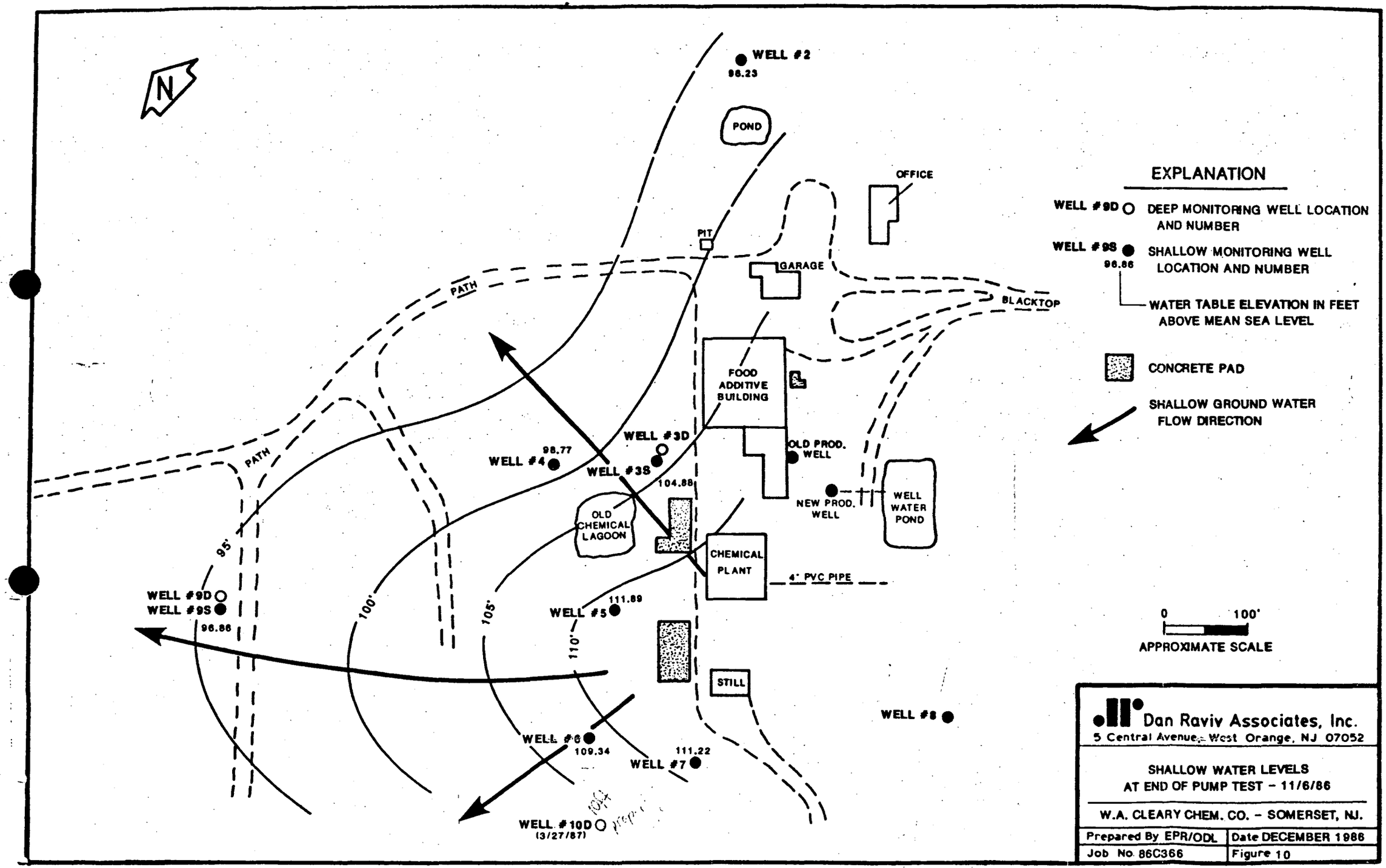
DEEP WATER LEVELS
AT START OF PUMP TEST – 11/4/86

W.A. CLEARY CHEM. CO. – SOMERSET, NJ.

Prepared By EPR/ODL	Date DECEMBER 1986
Job No. 86C366	Figure 11



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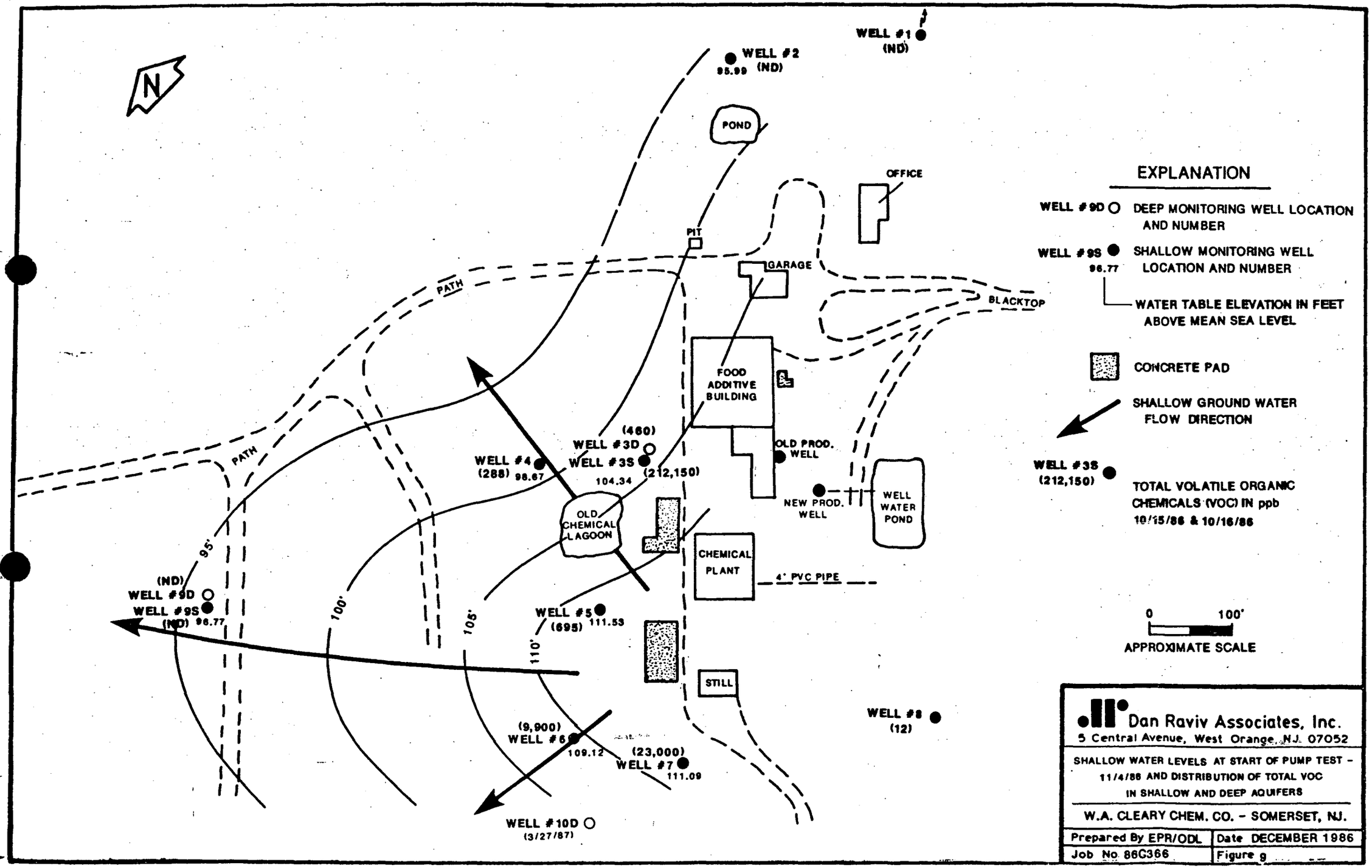
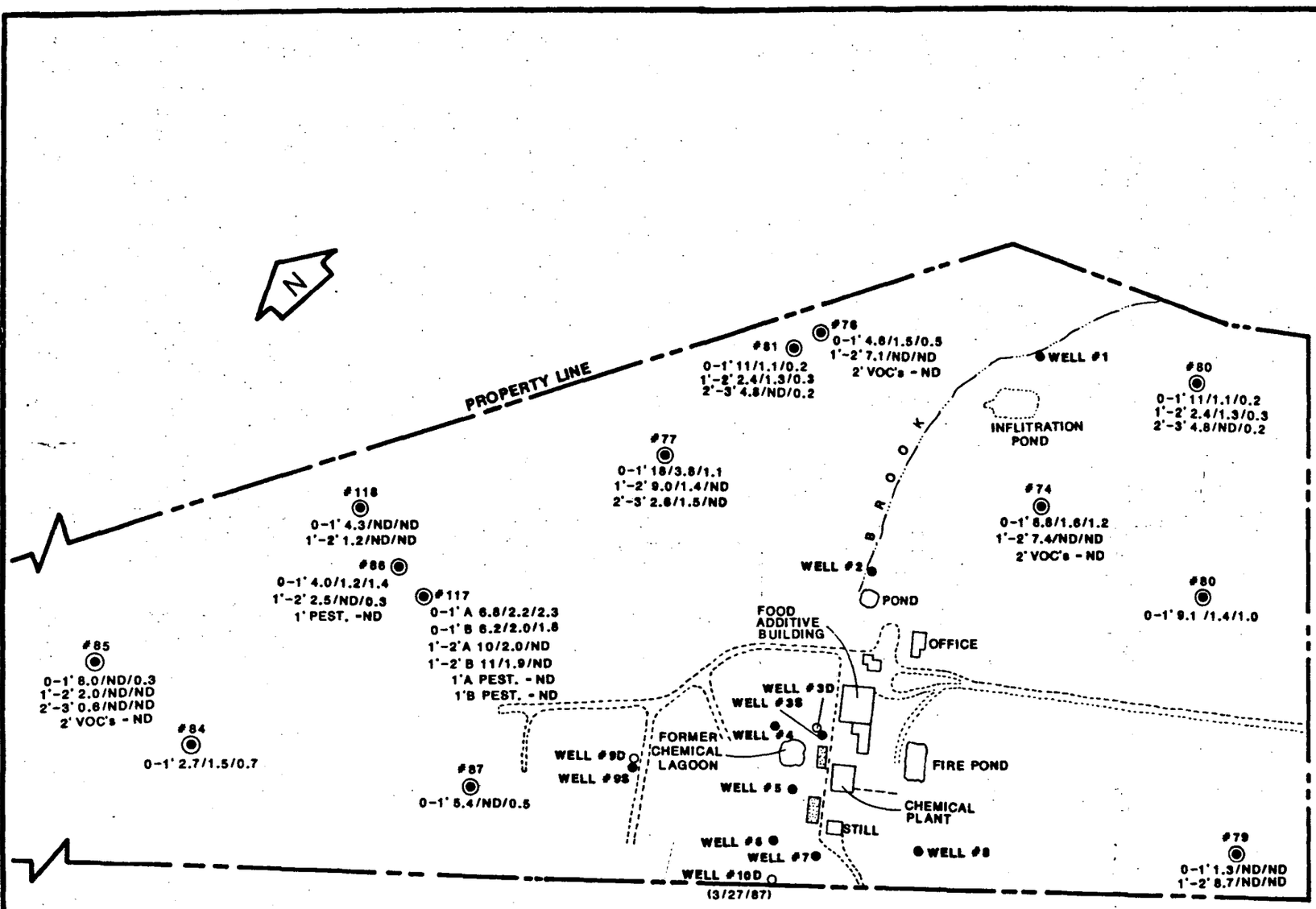
SHALLOW WATER LEVELS
AT END OF PUMP TEST – 11/6/86

W.A. CLEARY CHEM. CO. – SOMERSET, NJ.

Prepared By EPR/ODL	Date DECEMBER 1986
Job No. 86C366	Figure 10


N
WELL #1
(ND)
WELL #2
95.99
(ND)
POND
OFFICE
PIT
GARAGE
BLACKTOP
PATH
PATH
FOOD ADDITIVE BUILDING
(460)
WELL #3D
WELL #3S
(212,150)
104.34
WELL #4
(288)
98.67
OLD PROD. WELL
NEW PROD. WELL
WELL WATER POND
OLD CHEMICAL LAGOON
CHEMICAL PLANT
4" PVC PIPE
95'
100'
105'
110'
(ND)
WELL #9D
WELL #9S
(ND)
96.77
WELL #5
(695)
111.53
STILL
WELL #8
(12)
(9,900)
WELL #6
109.12
(23,000)
WELL #7
111.09
WELL #10D
(3/27/87)
EXPLANATION
WELL #9D DEEP MONITORING WELL LOCATION AND NUMBER
WELL #9S 96.77 SHALLOW MONITORING WELL LOCATION AND NUMBER
WATER TABLE ELEVATION IN FEET ABOVE MEAN SEA LEVEL
CONCRETE PAD
SHALLOW GROUND WATER FLOW DIRECTION
WELL #3S (212,150) TOTAL VOLATILE ORGANIC CHEMICALS (VOC) IN ppb 10/15/86 & 10/16/86
0 100'
APPROXIMATE SCALE
Dan Raviv Associates, Inc.
5 Central Avenue, West Orange, NJ. 07052
SHALLOW WATER LEVELS AT START OF PUMP TEST - 11/4/86 AND DISTRIBUTION OF TOTAL VOC IN SHALLOW AND DEEP AQUIFERS
W.A. CLEARY CHEM. CO. - SOMERSET, NJ.
Prepared By EPR/ODL
Date DECEMBER 1986
Job No. 86C366
Figure 9



EXPLANATION

WELL #9D ○ DEEP MONITORING WELL LOCATION AND NUMBER

WELL #9S ● SHALLOW MONITORING WELL LOCATION AND NUMBER

◉ ARSENIC/CADMIUM/MERCURY CONCENTRATION

0-1' 8.8/1.6/1.2 IN ppm AT 0 - 1 FOOT
1'-2' 7.4/ND/ND IN ppm AT 1 - 2 FEET

TOTAL METAL CONCENTRATION
2' VOC's - ND
1'A PEST - ND (1'B - DUPLICATE OF 1'A)

0 300'
APPROXIMATE SCALE

Dan Raviv Associates, Inc.
5 Central Avenue, West Orange, NJ 07052

TARA GREENS GOLF COURSE
ARSENIC/CADMIUM/MERCURY/VOC's AND PEST. CONCENTRATIONS IN ppm
SAMPLED 2/18/87 - 2/19/87 AND 3/12/87

W.A. CLEARY CHEM. CO. - SOMERSET, NJ

Prepared By EPR/ODL	Date APRIL 1987
Job No. 86C366	Figure 8

ATTACHMENT A

TABLES

ATTACHMENT A

Table I

Summary of Soil Sample Analysis - Manufacturing Facility

All values are reported as parts per million (ppm).

= Exceeding ECRA Cleanup Levels

Sample No.(1)(2)	Date of Sampling	Arsenic	Cadmium	Mercury
1	6/5/86	31.3 (20)	30.8 (3)	5.5
2	"	41.6	19.2	3.4
3	"	77.2	16.7	6.2
4	"	76.8	28.2	2.8
5	"	5.7	0.2	6.6
6	"	90.4	26.5	4.2
7	"	7.9	15.7	1.4
8	"	29.8	79.8	0.7
9	"	0.6	59.5	0.3
10	"	0.7	14.9	0.2
11	"	6.2	32.2	0.9
12	"	0.2	79.6	3.4
14	6/23/86	48.9	2.0	2.2
15	"	116.0	12.0	0.1
16	"	2.7	0.2	2.8
17	"	40.6	1.1	0.2
18	"	33.4	4.8	0.3
20	"	302	23.3	5.4
21	"	4.9	0.2	3.7
22	"	ND	0.2	0.3
23	"	2.0	0.5	0.2

(1) Reported concentrations of metals may be less than total due to incomplete acid digestion of Samples No. 1-50.
(2) Soil samples No. 1-50 are shown in Figure 3.

ATTACHMENT A

Dan Raviv Associates, Inc.
Job No. 86C366

Table I (cont.)

Summary of Soil Sample Analysis - Manufacturing Facility

All values are reported as parts per million (ppm).

Sample No.	Date of Sampling	Arsenic	Cadmium	Mercury
24	6/23/86	904	1620	40.8
26	"	536	21.6	7.6
27	"	24.2	5.8	9.4
30	"	504	74.5	6.6
36(3)	"	251	32.6	1.7
37	"	676	181	3.4
38	"	434	49.7	2.9
39	"	236	79.7	6.5
40	"	182	16.4	1.0
41	"	325	35.4	4.1
42	"	141	20.2	1.4
43	"	344	42.8	2.2
44	"	414	31.2	3.6
45	"	241	28.9	0.3
46	"	93	11.5	2.5
47	"	36.1	4.9	1.2
48	"	8.7	1.1	0.8
49	"	222	65.2	2.4
50	"	598	108	4.5
51(4)	12/16/87	35	18	230
52	"	125	60	240

(3) Soil samples No. 36-50 were taken inside the old chemical lagoon.
(4) Soil samples No. 51-65 are shown in Figure 4.

ATTACHMENT A

Dan Raviv Associates, Inc.
Job No. 86C366

Table I (cont.)

Summary of Soil Sample Analysis - Manufacturing Facility

All values are reported as parts per million (ppm).

Sample No.-Depth	Date of Sampling	Arsenic	Cadmium	Mercury
53	12/16/86	545	19	>1000
54	"	14	20	1.8
55	"	ND	4.0	1.2
56	"	8.5	8.0	4.1
57	"	108	11	25
58	"	127	65	170
59	"	22	18	2.5
60	"	172	134	900
61	"	137	70	310
62	"	24	20	3.8
63	12/17/86	ND	2.5	2.5
64	"	6.0	6.0	1.1
65	"	29	15	2.0
WAC-66-1 (5)	1/30/87	30	ND	28
WAC-66-2	"	16	ND	32
WAC-66-3	"	2.3	ND	0.9
WAC-67-1	"	11	ND	8.6
WAC-68-1	"	6.0	ND	9.4
WAC-69-1	2/2/87	140	200	19
WAC-69-2	"	39	89	5.6
WAC-69-3	"	18	12	2.5

(5) Soil samples No. WAC-66 to WAC-73 are shown in Figure 5. Last digit of sample no. is depth in feet below surface i.e., WAC-66-1', WAC-66-2'

ATTACHMENT A

Dan Raviv Associates, Inc.
Job No. 86C366

Table I (cont.)

Summary of Soil Sample Analysis - Manufacturing Facility

All values are reported as parts per million (ppm).

Sample No.-Depth	Date of Sampling	Arsenic	Cadmium	Mercury
WAC-70-1	"	870	250	25,000
WAC-70-2	"	340	11	19,000
WAC-70-3	"	330	2.1	360
WAC-71-1	"	4.8	ND	3.1
WAC-72-1	"	81	12	47
WAC-72-2	"	51	3.8	140
WAC-73-1	2/2/87	12	ND	1.1
WAC-83-1 (6)	2/19/87	10	ND	1.1
WAC-83-2	"	5.3	ND	0.6
WAC-83-3	"	10	1.1	ND
WAC-91-4	3/10/87	290	55	110,000
WAC-91-5	"	210	1.1	9,000
WAC-91-6	"	150	5.3	5,300
WAC-91-7	"	240	ND	4,100
WAC-92-4	"	8.2	ND	11
WAC-92-5	"	2.3	ND	1.1
WAC-92-6	"	14	25	260
WAC-92-7	"	10	ND	2.5
WAC-93-4A	"	11	13	2.4
WAC-93-4B	"	3.6	2.4	2.3
WAC-93-5	"	11	5.6	4.0
WAC-93-6	"	25	21	5.9
WAC-93-7	"	450	39	14
WAC-94-1	"	6.9	3.9	85
WAC-94-2	"	6.3	1.2	2.3
WAC-94-3	"	5.4	ND	1.1
WAC-94-4	"	3.7	ND	0.9
WAC-95-1	"	950	31	200
WAC-95-2	"	240	26	63
WAC-95-3	"	250	18	64
WAC-95-4	"	240	6.6	63
WAC-95-5	"	6.9	12	11

(6) Soil samples No. WAC-83 to WAC-113 are shown in Figure 6.

ATTACHMENT A

Table I (cont.)

Summary of Soil Sample Analysis - Manufacturing Facility

All values are reported as parts per million (ppm).

Boring No.	Date of Sampling	Arsenic	Cadmium	Mercury
WAC-95-6A	"	8.9	9.8	0.8
WAC-95-6B	"	4.5	ND	ND
WAC-96-1	"	24	ND	8.6
WAC-96-2	"	4.0	ND	0.5
WAC-96-3	"	2.8	ND	ND
WAC-96-4	"	2.4	ND	ND
WAC-97-1	"	7.2	ND	140
WAC-97-2	"	6.3	ND	94
WAC-98-1			"	9.3
2.3				ND
WAC-98-2A	"	5.6	ND	0.3
WAC-98-2B	"	1.9	ND	0.3
WAC-100-1	3/10/87	1.3	ND	0.2
WAC-100-2	"	2.0	ND	ND
WAC-101-1	"	4.3	ND	6.4
WAC-101-2	"	2.4	ND	ND
WAC-102-1	3/11/87	110	11	32
WAC-102-2	"	12	1.6	1.5
WAC-103-1	"	29	140	1,700
WAC-103-2	"	7.5	1.2	1.5
WAC-104-1	"	25	1.9	11
WAC-104-2	"	6.6	1.3	0.2
WAC-105-1	"	9.4	ND	0.6
WAC-105-2	"	7.8	ND	ND
WAC-106-1	"	6.7	ND	3.4
WAC-106-2	"	12	1.9	ND
WAC-107-1A	"	12	1.6	1.4
WAC-107-1B	"	6.6	1.4	1.6
WAC-107-2A	"	4.6	ND	ND
WAC-107-2B	"	5.8	ND	ND
WAC-108-1	"	7.3	1.5	ND
WAC-108-2	"	5.8	1.4	ND

ATTACHMENT A

Table I (cont.)

Summary of Soil Sample Analysis - Manufacturing Facility

All values are reported as parts per million (ppm).

Boring No.	Date of Sampling	Arsenic	Cadmium	Mercury
WAC-109-1	"	31	7.1	35
WAC-109-2	"	13	1.2	13
WAC-109-3	"	7.6	ND	ND
WAC-109-4	"	6.8	ND	ND
WAC-110-1	"	73	2.2	.16
WAC-110-2	"	70	9.4	120
WAC-112-1	"	5.0	ND	0.6
WAC-112-2	"	2.2	ND	ND
WAC-113-1	"	8.8	1.3	ND
WAC-113-2	"	4.5	ND	ND

ATTACHMENT A

Dan Raviv Associates, Inc.
Job No. 86C366

Table II

Summary of Soil Sample Analysis - Pit, Stream and Lagoon

All values are reported as parts per million (ppm).

Sample No.-Depth	Date of Sampling	Arsenic	Cadmium	Mercury
WAC-75-1(1)(2)	2/18/87	16	3.2	22
WAC-78-1	"	9.9	1.9	6.4
WAC-82-1	2/19/87	47	2.9	6.1
WAC-88-7	"	6.8	ND	9.6
WAC-111-1	3/12/87	10	20	30
WAC-111-5	"	240	1.3	4.6
WAC-114-2	3/13/87	4.9	1.6	ND
WAC-114-3	"	4.5	1.7	1.0
WAC-115-2	"	24	2.4	1.1
WAC-115-3	"	13	1.4	1.2
WAC-116-2	"	3.1	1.3	8.1
WAC-116-3	"	1.7	1.1	1.4
WAC-119-1	"	73	2.8	9.5

(1) Soil samples are shown in Figure 7.

(2) Last digit of sample no. depth in feet below surface, i.e., WAC-75-1', WAC-78-1'.

ATTACHMENT A

Table III

Summary of Soil Sample Analysis - Tara Greens Golf Course

All values are reported as parts per million (ppm).

Sample No.-Depth	Date of Sampling	Arsenic	Cadmium	Mercury
WAC-74-1(1)(2)	2/18/87	8.8	1.6	1.2
WAC-74-2	"	7.4	ND	ND
WAC-76-1	"	4.6	1.5	0.5
WAC-76-2	"	7.1	ND	ND
WAC-77-1	"	18	3.8	1.1
WAC-77-2	"	9.0	1.4	ND
WAC-77-3	"	2.6	1.5	ND
WAC-79-1	2/19/87	1.3	ND	ND
WAC-79-2	"	8.7	ND	0.2
WAC-80-1	"	9.1	1.4	1.0
WAC-81-1	"	11	1.1	0.2
WAC-81-2	"	2.4	1.3	0.3
WAC-81-3	"	4.8	ND	0.2
WAC-84-1	"	2.7	1.5	0.7
WAC-85-1	"	8.0	ND	0.3
WAC-85-2	"	2.0	ND	ND
WAC-85-3	"	0.6	ND	ND
WAC-86-1	"	4.0	1.2	1.4
WAC-86-2	"	2.5	ND	0.3
WAC-87-1	"	5.4	ND	0.5
WAC-117-1A	3/12/87	6.8	2.2	2.3
WAC-117-1B	"	6.2	2.0	1.8
WAC-117-2A	"	10	2.0	ND
WAC-117-2B	"	11	1.9	ND
WAC-118-1	"	4.3	ND	ND
WAC-118-2	"	1.2	ND	ND

(1) Soil samples are shown in Figure 8.

(2) Last digit of sample no. depth in feet below surface, i.e., WAC-74-1', WAC-74-2'.

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Job No. 86C366

ATTACHMENT A

Table IV

Summary of Soil Sample Pesticides and VOC Analysis

All values are reported as parts per million (ppm).

Sample No.-Depth Manufacturing Facility	Date of Sample (1)	Pesticides	VOC
WAC-66-3 (2)	1/30/87		1.40
WAC-70-3	2/2/87		1.93
WAC-72-2	"		0.91
WAC-83-1	2/19/87	ND	
WAC-91-6	3/10/87	ND	
WAC-91-7	"		ND
WAC-92-5	"	ND	
WAC-92-6	"		ND
WAC-93-6	"	ND	
WAC-93-7	"		ND
WAC-94-4	"		ND
WAC-95-5	"		ND
WAC-95-6A	"	ND	
WAC-96-4	"		ND
WAC-102-2	3/11/87	ND	ND
WAC-103-2	"	ND	
WAC-104-2	"	ND	
WAC-107-2A	"	ND	
WAC-107-2B	"	ND	
WAC-109-2	"		ND
WAC-109-3	"	ND	
WAC-109-4	"		ND
WAC-112-2	"	ND	

(1) Soil samples are shown in Figures 5 and 6.

(2) Last digit sample no. depth in feet below surface, i.e., WAC-66-3', WAC-70-3'.

Dan Raviv Associates, Inc.
Job No. 86C366

ATTACHMENT A

Table IV (cont.)

Summary of Soil Sample Pesticides and VOC Analysis

All values are reported as parts per million (ppm).

Sample No.-Depth	Date of Sample	Pesticides	VOC
Pit, Stream and Lagoon (3)			
WAC-82-1	2/19/87		0.94
WAC-88-7	"		ND
WAC-114-2	3/12/87	ND	
WAC-115-3	"		ND
Tara Greens Golf Course (4)			
WAC-74-2	2/18/87		ND
WAC-76-2	"		ND
WAC-85-2	2/19/87		ND
WAC-86-1	"	ND	
WAC-117-1A	"	ND	
WAC-117-1B	3/12/87	ND	

(3) Soil samples are shown in Figure 7.
(4) Soil samples are shown in Figure 8.

Table V

Primary Ground Water Quality Standards

Parameter	Standard
Aldrin/Dieldrin	0.003 ug/l
Arsenic and Compounds	0.05 mg/l
Barium	1.0 mg/l
Benzidine	0.001 mg/l
Cadmium and Compounds	0.01 mg/l
Chromium (Hexavalent) and Compounds	0.05 mg/l
Cyanide	0.2 mg/l
DDT and Metabolites	0.001 ug/l
Endrin	0.004 ug/l
Lead and Compounds	0.05 mg/l
Mercury and Compounds	0.002 mg/l
Nitrate-Nitrogen	10 mg/l
Phenol	3.5 mg/l
Polychlorinated Biphenyls	0.001 7ug/l
Radionuclides	USEPA prevailing regulations
Selenium and Compounds	0.01 mg/l
Silver and Compounds	0.05 mg/l
Toxaphene	0.005 ug/l
Total Volatile Organics by GC/MS	50 ug/l

Table VI

Monitor Well Specifications

Monitor Well Number	Top of Casing Elev. (ft)	Type of Casing	Length of Casing (ft)	Depth of Well (ft)	Casing above Ground (ft)
1	105.87	6-5/8" OD steel	13	30.39	1.03
2	114.76	"	14	46.03	0.80
3S	123.27	"	17	31.42	0.83
3D	124.19	"	83	121.80	1.80
4	123.15	"	21	59.73	0.42
5	123.90	"	17	31.96	0.99
6	123.84	"	16	32.61	0.96
7	124.24	"	17	35.19	0.80
8	119.73	"	32	72.13	1.11
9S	128.15	"	32	60.73	1.65
9D	128.85	"	82	100.90	2.48
Old Prod Well	123.91	"	-	241.10	0.88
10D	well installed March 27, 1987 will be surveyed May, 1987			100 ±	

Dan Raviv Associates, Inc.
Job No. 86C366

ATTACHMENT A

Table VII

Summary of Ground Water Analysis
October 9, 1983

All values are reported as parts per billion (ppb).

Well	Total Concentrations[1] Arsenic	Cadmium	Mercury	Volatile Organics	
1	28	4	1	110	chloroform
				10	1,1,1-trichloroethane
2	29	11	0.5	4	methylene chloride
				62	chloroform
				11	trichloroethane
				14	benzene
				12	carbon tetrachloride
3S	211	62	6	3,000	chloromethane
				66	methylene chloride
				12,150	chloroform
				1	1,1,1-trichloroethane
				118	benzene
				129	1,1,2,2-tetrachloroethene
				35	1,1,2,2-tetrachloroethane
				18	ethylbenzene
				46,500	carbon tetrachloride
				7,000	bromodichloromethane
				115	bromobenzene
				160	trimethylbenzene
				94	o,m,p-xylenes
				31	cyclopropylbenzene
				55	2,3-benzofuran
4	115	15	3	77	chloroform
				7	1,1,1-trichloroethane
				23	benzene
				62	carbon tetrachloride
				3	2,3-benzofuran

Note: Pesticides and lead analysis for all wells was ND.

(1) Water samples not filtered prior to addition of acid.

Dan Raviv Associates, Inc.
Job No. 86C366

ATTACHMENT A

Table VII (cont.)

Summary of Ground Water Analysis
October 9, 1983

All values are reported as parts per billion (ppb).

Well	Total Concentrations			Volatile Organics	
	Arsenic	Cadmium	Mercury		
5	3,057	166	2	13	1,1-dichloroethane
				43	trans-1,2-dichloroethane
				7	1,1,1-trichloroethane
				20,000	dibromochloroethane
				1,550	benzene
				2	1,1,2,2-tetrachloroethane
				2	toluene
				51	carbon tetrachloride
				65	trimethylbenzene
6	87	94	1	63	chloroform
				7	1,1,1-trichloroethane
				30,000	dibromochloromethane
				18,000	benzene
				2	bromoform
				3	1,1,2,2-tetrachlorethene
				1	1,1,2,2-tetrachlorethane
				18	carbon tetrachloride
7	28	1	1	67	chloroform
				7	1,1,1-trichloroethane
				9,500	dibromochloromethane
				12	chlorobenzene
				8	trimethylbenzene
				2	p-xylene
				3	cyclopropylbenzene

Note: Pesticides and lead analysis for all wells was ND.

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Table VIII

Summary of Ground Water Analysis
July 24, 1986

All values are reported as parts per billion (ppb).

Well	Total Concentrations[1] Arsenic	Cadmium	Mercury	Volatile Organics	
1	10	10	32	Not Sampled	
2	<10	<10	<1	Not Sampled	
3S	280	<10	<1	800	trans-1,2-dichloroethylene
				800	1,1,1-trichloroethane
				44	trichloroethylene
				8,745	methyl tert-butyl ether
				115	1,1,2-trichloroethane
				208	1,1,2,2-tetrachloroethane
				3	1,2-dichlorobenzene
				11	1,4-dichlorobenzene
3D	280	<10	2	3	1,1,2-trichloroethane
				264	benzene
				4	toluene
				12	ethylbenzene
4	<10	<10	3	3	benzene
				16	1,4-dichlorobenzene
5	880	30	29	146	benzene
				10	ethylbenzene
6	<10	<10	13	800	benzene
				5	toluene
				9	ethylbenzene

Note: Pesticides and Lead analysis for all wells was ND.

(1) Water samples not filtered prior to addition of acid.

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Table VIII (cont.)

Summary of Ground Water Analysis
July 24, 1986

All values are reported as parts per billion (ppb).

Well	Total Concentrations			Volatile Organics	
	Arsenic	Cadmium	Mercury		
7	10	<10	3	1,946	trichloroethylene
				32	toluene
				30	ethylbenzene
				89	m,p-xylenes
				8	1,4-dichlorobenzene
8	<10	<10	9	51	benzene
9S	<10	<10	35		ND
9D	10	20	120	8	chloroform

Note: Pesticides and Lead analysis for all wells was ND.

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Table IX

Summary of Ground Water Analysis
October 15, 1986

All values are reported as parts per billion (ppb).

	Soluble Concentrations[1]				
Well	Arsenic	Cadmium	Mercury	Volatile Organics	
1	<10	<5	<0.5		ND
2	<10	<5	<0.5		ND
3SA	<10	<5	<0.5	7,000	chloroform
				800,000	carbon tetrachloride
3SB	no sample	no sample	no sample	6,000	chloroform
				3,400,000	carbon tetrachloride
3DA	<10	<5	<0.5		ND
3DB	<10	<5	<0.5		no sample
4	<10	<5	<0.5	170	carbon tetrachloride
9S	<10	<5	<0.5		ND
9D	<10	<5	<0.5		ND
Field blank	<10	<5	<0.5		ND
Travel blank	<10	<5	<0.5		ND

(1) Water samples were filtered prior to the addition of acid.

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Table IX (cont.)

Summary of Ground Water Analysis
October 16, 1986

All values are reported as parts per billion (ppb).

	Soluble Concentrations			Volatile Organics	
Well	Arsenic	Cadmium	Mercury		
3S-R	70	<5	<0.5	4,400	chloroform
				560,000	carbon tetrachloride
				4,500	benzene
3D-R	90	<5	<0.5	550	carbon tetrachloride
				680	benzene
5	3,040	<5	<0.5	7	ethylbenzene
6	1,190	<5	<0.5	820,000	benzene
7A	210	<5	<0.5	50,000	benzene
7B	300	<5	<0.5	200,000	benzene
8	1,630	<5	<0.5		ND
Field blank	<10	<5	<0.5		ND
Travel blank	<10	<5	<0.5		ND

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Table IX (cont.)

Summary of Ground Water Analysis
October 16, 1986

All values are reported as parts per million (ppm).

Well	Arsenic
3S-R	<0.010
3D-R	0.018
5	3.920
6	0.930
7A	Insufficient Sample
7B	0.910
8	3.250
Field blank	Insufficient Sample

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Table X

Monitoring Well Water Analysis
January 13, 1987

All values are reported as parts per billion (ppb).

	Soluble Concentration(1)					
Well	Arsenic	Cadmium	Mercury	Pesticides	Volatile Organics	
1	6.3	ND	ND	no sample	ND	
2	ND	ND	ND	no sample	ND	
3S-A	no sample	no sample	no sample	no sample	160,000	carbon tetrachloride
					9,400	chloroform
3S-B	no sample	no sample	no sample	no sample	230,000	carbon tetrachloride
					18,000	chloroform
					6,900	toluene
3D	1,300	ND	ND	1,600 2,4-D	460	benzene
9S	ND	ND	ND	no sample	ND	
9D	ND	ND	ND	no sample	ND	
Field Blank	ND	ND	ND	ND	4.9	methylene chloride
					4.6	toluene
Trip Blank	7.6	ND	ND	ND	4.4	toluene

(1) Water samples were filtered prior to the addition of acid.

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Table X (cont.)

Monitoring Well Water Analysis
January 14, 1987

All values are reported as parts per billion (ppb).

	Soluble Concentration				
Well	Arsenic	Cadmium	Mercury	Pesticides	Volatile Organics
3S-A	1,300	ND	ND	5,500 2,4-D	no sample
3S-B	1,300	ND	ND	5,200 2,4-D 2.2 Endosulfan II	no sample
4	27	ND	ND	no sample	20 chloroform 120 carbon tetrachloride 2.2 toluene 117 trimethyl benzene 29 ethylmethyl benzene
5A	3,400	ND	ND	2,000 2,4-D 1.3 Dieldrin	100 carbon tetrachloride 680 benzene 12 toluene
5B	4,300	ND	ND	1,800 2,4-D	610 benzene
6	11	ND	ND	40 2,4-D	9,900 benzene
7	510	ND	ND	no sample	23,000 benzene
8	5.6	ND	ND	ND	11 carbon tetrachloride 1.3 toluene
Field Blank	ND	ND	ND	ND	7.4 benzene 4.5 toluene
Trip Blank	7.6	ND	ND	ND	4.4 toluene

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Table XI

Summary of Ground Water Analysis - New Production Well

All values are reported as parts per billion (ppb).

Date Sample Collected	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	Volatile Organics
3/9/87	11	-(1)	<10	-	-	<2	-	-	ND
1/14/87	-	-	-	-	-	-	-	-	ND
6/9/86	<10	120	<10	<20	<20	<1	<10	<10	ND
5/23/86	<10	<100	<10	30	<20	1	<10	<10	ND
2/18/86	<10	370	<10	<20	<20	<1	<10	<10	
11/18/85	<10	<10	<10	<20	30	<1	<10	<10	ND
2/4/85	<20	360	<10	<20	<50	<1	<10	<10	ND
12/4/84	20	<50	30	<20	<50	<2	<10	<20	37 chloroform
8/10/84	10	-	<5	-	<5	<2	<10	-	-
3/1/84	-	-	<10	-	-	-	-	-	-
2/22/84	20	-	30	-	-	<2	-	-	-
2/10/83	<50	-	24	-	-	<2	-	-	-
12/7/82	100	-	27	-	-	2	-	-	-
9/28/82	2	-	2	-	-	<2	-	-	-
4/5/82	2	-	5	-	-	4	-	-	-
1/6/82	5	-	3	-	-	6	-	-	-
10/30/81	2	-	4	-	-	2	-	-	-
6/11/81	14	-	2	-	-	1	-	-	-
5/19/81	<20	-	<10	-	-	<2	-	-	-
5/13/81	123	-	<27	-	-	<18	-	-	-
2/26/81	<20	-	<10	-	-	<2	-	-	-

Notes: As = Arsenic, Ba = Barium, Cd = Cadmium, Pb = Lead, Hg = Mercury, Se = Selenium, and Ag = Silver.
(1) Parameter not analyzed.

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Table XII

Formation Constants Derived from Pump Test

Method	Transmissivity	Storativity	Vertical Conductivity Semi-confining Layer(1)
Monitoring Well 3D			
Jacob	1920 gpd/ft	1.772×10^{-4}	-
Hantush-Jacob	1059 gpd/ft	2.138×10^{-3}	2.89×10^{-3} ft/day (1.02×10^{-6} cm/sec)
Hantush I	1125 gpd/ft	1.692×10^{-2}	2.09×10^{-3} ft/day (7.38×10^{-7} cm/sec)
Residual drawdown	1121 gpd/ft	-	-
Average:	1306 gpd/ft	6.412×10^{-3}	2.49×10^{-3} ft/day (8.78×10^{-7} cm/sec)
Monitoring Well 8			
Jacob	1980 gpd/ft	3.467×10^{-4}	-
Hantush-Jacob	1448 gpd/ft	3.414×10^{-4}	4.25×10^{-4} ft/day (1.50×10^{-7} cm/sec)
Hantush I	1722 gpd/ft	2.950×10^{-3}	8.95×10^{-4} ft/day (3.15×10^{-7} cm/sec)
Residual drawdown	1463 gpd/ft	-	-
Average:	1653 gpd/ft	1.212×10^{-3}	6.60×10^{-4} ft/day (2.33×10^{-7} cm/sec)

(1) Semi-confining layer estimated to be 10 feet.

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Table XII (cont.)

Formation Constants Derived from Pump Test

Method	Transmissivity	Storativity	Vertical Conductivity Semi-confining Layer(1)
Old Production Well			
Jacob	2112 gpd/ft	1.759×10^{-3}	-
Hantush-Jacob	1520 gpd/ft	2.252×10^{-3}	6.12×10^{-3} ft/day (2.17×10^{-6} cm/sec)
Hantush I	1885 gpd/ft	1.604×10^{-2}	6.42×10^{-3} ft/day (2.26×10^{-6} cm/sec)
Residual drawdown	1818 gpd/ft	-	-
Average:	1834 gpd/ft	6.680×10^{-3}	6.29×10^{-3} ft/day (2.22×10^{-6} cm/sec)

(1) Semi-confining layer estimated to be 10 feet.

ATTACHMENT A

Dan Raviv Associates, Inc.
Job No. 86C366

Dan Raviv Associates, Inc.
Consultants in hydrogeology, water quality, landfill hydrology and ECRA compliance

HYDROGEOLOGIC AND GROUND-WATER CONTAMINANT CONDITIONS AND CONCEPTUAL GROUND-WATER REMEDIATION PLAN
W.A. CLEARY CORPORATION
SOMERSET, NEW JERSEY
NJPDES NO. NJ0003816

Prepared for:

W.A. Cleary Corporation
Somerset, New Jersey

Attention: Dr. Louis Ricciardi, CEO

Prepared by:

Dan Raviv Associates, Inc.
57 East Willow Street
Millburn, New Jersey 07041

DRAI Job No. 86C366

July 11, 1988

ATTACHMENT B

Dan Raviv Associates, Inc.
Consultants in hydrogeology, water quality, landfill hydrology and ECRA compliance

July 11, 1988

State of New Jersey
Department of Environmental Protection
Division of Water Resources
Bureau of Ground-Water Discharge Permits
401 East State Street - 4th Floor
Trenton, New Jersey 08625

Attention: George Campbell, Geologist

Re: Transmittal of Ground-Water Remediation Plan
W.A. Cleary Corporation, Somerset, New Jersey
NJPDES No. NJ0003816
DRAI Job No. 86C366

Dear Mr. Campbell:

As has requested by W.A. Cleary Corporation (Cleary), Dan Raviv Associates, Inc. (DRAI) has prepared a ground-water remediation plan entitled "Hydrogeologic and Ground-Water Contaminant Conditions and Conceptual Ground-Water Remediation Plan, W.A. Cleary Corporation, Somerset, New Jersey". This conceptual ground-water remediation plan is based on DRAI's comprehensive evaluation of hydrogeologic and ground-water contaminant conditions at the Cleary site. The remediation plan incorporates an evaluation of new ground-water monitoring data developed from five additional, recently installed wells (MW8S, MW10S, MW11S, MW11D and MW13S). In light of this additional well information, we have confidently determined ground-water flow patterns and hydraulic characteristics for the shallow and deeper aquifers. Moreover, we have defined the extent of the shallow and deeper ground-water contaminant plume underlying the Cleary site.

Also, based on the June 1988 results, it appears that off-site migration of contamination has probably occurred along the southwestern property boundary.

Remedial concepts presented herein are limited to the ground-water recovery system portion of the remedial system, i.e., that which is actively involved in the withdrawal of ground water. Preliminary work has also been performed by DRAI concerning the design of an on-site treatment system. This will include air stripping, carbon adsorption or a combination of the two.

57 East Willow Street, Millburn, New Jersey 07041 (201) 564-6006/FAX (201) 564-6442

ATTACHMENT B

We look forward to meeting with you following your review of this report so that we may discuss your comments. If you have any questions or require additional information, please call.

Very truly yours,

DAN RAVIV ASSOCIATES, INC.

Douglas J. Swanson

Douglas J. Swanson
Senior Hydrogeologist/Project Manager

Rev:

Dan D. Raviv, Ph.D.
President

DS/sel
cc: Louis G. Ricciardi, Ph.D.
Steven J. Picco, Esq.
Mary E. Fletcher (NJDEP)
Liz Matasit (Case Manager, ECRA)

ATTACHMENT B

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HYDROGEOLOGIC AND GROUND-WATER CONTAMINANT CONDITIONS AND CONCEPTUAL GROUND-WATER REMEDIATION PLAN W.A. CLEARY CORPORATION NJPDES NO. NJ0003816

1.0 INTRODUCTION

Dan Raviv Associates, Inc. (DRAI) has performed a comprehensive evaluation of hydrogeologic and ground-water contaminant conditions at the W.A. Cleary Chemical Corporation (Cleary) plant in Somerset, Franklin Township New Jersey. The overall objectives of this investigation were to refine our understanding of ground-water conditions in light of recently developed additional hydrogeologic and ground-water quality information and provide recommendations for the permanent remediation of ground-water contamination at the Cleary site.

Preliminary remedial concepts presented herein are based on our current understanding of ground-water conditions at the site and are limited to the ground-water recovery system portion of the remedial system, i.e., that which is actively involved in the withdrawal of ground water. Conceptual design information for the on-site treatment system are currently being developed by DRAI and their subcontractors and will be submitted to Cleary for review following submittal of this report. Preliminary work performed by DRAI indicates that a combination of air stripping/activated carbon air filtering or activated carbon aqueous columns are the preferred method of treatment of contaminated ground water at the site. DRAI is also evaluating the need for remediation of low levels of arsenic anticipated in the effluent stream.

This report summarizes all recently developed hydrogeologic and ground-water quality information developed by DRAI. This information was utilized in conjunction with information previously developed by DRAI (DRAI, 1987A) as part of the ongoing soil and ground-water investigation at the Cleary site in connection with their compliance with the NJPDES permit requirements.

1.1 Background

The W.A. Cleary Chemical Corporation site is located in Somerset, New Jersey. The Cleary site is comprised of a municipal golf course and an agricultural chemical manufacturing facility, which are geographically and functionally separate from each other. Agricultural chemical manufacturing operations have been performed at the site since 1948. As shown in Figure 1, the prominent structures comprising the manufacturing area are the food additive building, the chemical plant still, the former chemical lagoon and the septic field located near well cluster MW3.

Preliminary results of DRAI's investigation of soil and ground-water conditions at the site were presented to the New Jersey Department of Environmental Protection (NJDEP) in the April 1987 report entitled "Hydrogeologic and Soils Investigation, W.A. Cleary Chemical Corporation,

Somerset, New Jersey". The results presented in the April 1987 DRAI report indicate that soils at and near the chemical plant contain elevated concentrations of mercury, arsenic and cadmium. In addition, ground water underlying the site was contaminated with volatile organic compounds (VOCs), arsenic, pesticides and on one occasion, mercury. Principal VOCs detected in the ground water were benzene and carbon tetrachloride.

DRAI and NJDEP recommended that additional monitoring wells were necessary to better define hydrogeologic and ground-water contaminant conditions at the site. Locations and justifications for the additional monitoring wells were outlined in the December 1987 DRAI report entitled "Proposed Supplemental Sampling Plan, W.A. Cleary Chemical Corporation, Somerset, New Jersey".

In a February 29, 1988 letter to Cleary, the NJDEP Division of Water Resources (DWR) directed Cleary to submit a plan for remediation of ground-water contamination at the site. This action is in accordance with part IV-4.B of Cleary's NJPDES/DGW permit which allows the NJDEP to require Cleary to initiate ground-water remediation if contamination is present.

1.2 Objectives and Scope

Cleary retained DRAI to select a conceptual design for a ground-water recovery system to remediate ground-water contamination at their site. To accomplish these objectives, additional tasks were undertaken by DRAI to:

(1) further characterize hydrogeologic and ground-water contaminant conditions at the site, and
(2) develop a preliminary model of the shallow and deeper ground-water system to assist in selecting the preliminary design of a ground-water recovery system.

Field tasks were performed by DRAI between January and June 1988. Field tasks included the drilling of additional monitoring wells, the collection and analysis of ground-water samples from all existing and newly installed monitoring wells at the site, slug testing of monitoring wells completed in the shallow bedrock and the measurement of water levels in all new and existing monitoring wells at the site.

A description of the procedures used during the installation and sampling of monitoring wells is provided in the DRAI December 1987 work plan (DRAI 1987B) entitled "Proposed Supplemental Sampling Plan, W.A. Cleary Chemical Corporation, Somerset, New Jersey". Geologic logs and well construction details for the newly installed monitoring wells are presented in Appendix A. Slug testing data area provided in Appendix B. The results of ground-water sampling performed in January and June 1988 are presented in Appendices C and D, respectively.

2.0 HYDROGEOLOGY

Information on hydrogeologic conditions at the Cleary site was obtained during the drilling of five additional monitoring wells (MW8S, MW10S, MW11S, MW11D and MW13S; Figure 1), from data presented in DRAI's April 1987 report (DRAI, 1987A) and from published studies of the area (Kummel, 1940; Vecchioli, 1967; Vecchioli and others, 1969 and Spayd, 1985). These hydrogeologic data, along with water level and hydraulic conductivity data, were used to further refine DRAI's understanding of hydrogeologic conditions at the site. An understanding of hydrogeologic conditions was necessary to determine the factors controlling the migration of ground-water contamination, and to select the appropriate conceptual design for ground-water recovery system.

An evaluation of hydrogeologic conditions at the site, which incorporates recently developed hydrogeologic information, is discussed in the following subsections.

2.1 Geology

Unconsolidated sediments of Pleistocene to Holocene age overlie the sedimentary bedrock at the site and range in thickness from a few inches to as much as 10 feet, with the greatest accumulations associated with bedrock topographic lows.

The unconsolidated deposits consist of silty clays (weathered bedrock) and sandy clays with little gravel.

The Brunswick Shale of Triassic age immediately underlies the unconsolidated sediments at the site and is several thousand feet thick. In the study area, the Brunswick Formation consists mainly of fractured reddish-brown shales and siltstones with some interbedded sandstones.

Information developed from drilling of monitoring wells and trenching (for the purpose of soil sample collection) performed at the site indicate that generally the upper most ten feet of the Brunswick Formation is highly weathered and less competent than the deeper bedrock.

Locally, the Brunswick Shale strikes at approximately north 45° east and exhibits a bedding dip of approximately 5 to 10° northwest. Fractures and bedding-plane partings are prominent and provide the principal means for the flow of ground water in the Brunswick Shale. The relationship of the dipping beds to the screened intervals of some monitoring wells installed at the site is illustrated in Figure 2.

Previous investigations of the Brunswick Shale (Vecchioli, 1967; Vecchioli and others, 1969; and Spayd, 1985) have identified major fracture sets developed in a direction parallel to the strike of the formation. Fractures will typically terminate against bedding planes in apparent response to competency contrasts between siltstone, shale and sandstone units of the Brunswick Formation. In view of these observations, it is

reasonable to expect that ground-water flow, in terms of contaminant migration, will be effected by the structural expression (strike, dip and fractures) of the Brunswick Formation.

2.2 Ground-Water Hydrology

Hydrogeologic data were obtained to determine the extent of saturated conditions, aquifer characteristics and ground-water flow patterns in the subsurface at the Cleary site. These factors will control the migration of ground-water contamination and, as a result, will influence the design and performance of a remediation system.

2.2.1 Extent of Saturated Conditions

Ground water has not been encountered in the unconsolidated deposits underlying the Cleary site. Ground water in the shallow bedrock (0-60 feet below land surface) is under water-table conditions with a depth to water varying from approximately 4 feet below land surface (MW1) to 22 feet below land surface (MW9S). Ground water in the deeper bedrock is generally encountered from 18 to 30 feet below grade. A comparison of shallow and deeper ground-water elevations indicates a downward vertical gradient (Table I and Figure 2).

2.2.2 Ground-Water Flow Patterns

Water levels were measured in all existing shallow and deeper bedrock monitoring wells on 13 occasions between October 1986 and June 1988. A summary of ground-water elevation data for these 13 measuring rounds is presented in Table I.

Ground-water elevations for the shallow bedrock were contoured for the most recent measuring round, June 21, 1988. Contoured shallow ground-water elevations measured on June 21, 1988 are the most comprehensive and are considered representative of ground-water flow patterns determined during different seasons. These contours are shown in Figure 3.

As shown in Figure 3, a ground-water mound is present beneath the area containing the chemical plant and still. Ground-water flow is radially away from the mound with the hydraulic gradient being significantly steeper on the southeast side of the mound. This mound appears to be in response to a localized topographic high centered over the mound (Figure 2).

Testing was performed to determine if surface waters present in this area (the well-water pond, ponded water near the former chemical lagoon and other excavations) also contribute to the mound. Testing was comprised of draining the well-water pond dry for a period of two days and concurrently monitoring ground-water elevations in nearby monitoring wells. No trend of decreasing ground-water elevations was observed suggesting that the surface waters present are not the major source contributing to the ground-water mound.

Ground-water elevations for the deeper bedrock were contoured for two recent measuring rounds, June 21, 1988 (Figure 4) and June 3, 1988 (Figure 5) to illustrate ground-water flow patterns during static

conditions (June 3, 1988) and during the pumping of the "new" production well (June 21, 1988). As shown in Figure 5 (static conditions), the ground-water mound present in the shallow bedrock (Figure 3) is not reflected in the deeper bedrock. Ground water in the deeper bedrock flows to the southeast and in a direction perpendicular to the strike of the Brunswick Formation. The horizontal flow gradient for the deeper bedrock is relatively low, equaling approximately 0.006 foot per foot.

The deeper ground-water flow direction as depicted in Figure 5 is opposite to that depicted in DRAI 1987A due to a typographical error of the ground-water elevation for well MW9D. The present interpretation of ground-water flow direction for the deeper bedrock is the correct one.

Ground-water flow patterns during normal operation (pumping) of the new production well are illustrated in Figure 4. The pumping of the new production well creates a cone of depression which is elongated in the approximate strike direction of the Brunswick Formation.

During pumping conditions, ground water upgradient is directed toward the new production well. As shown in Figure 6, the areas influenced to the greatest degree by pumping of the new production well are located along strike (i.e., northeast and southwest of the new production well). In addition, the horizontal flow gradient during pumping conditions equals approximately 0.02 foot per foot, approximately 3.5 times greater than the gradient observed during static (non-pumping) periods.

2.2.3 Aquifer Characteristics

A 24-hour pump test was conducted by DRAI in November 1986 to estimate the hydraulic properties of the Brunswick Formation underlying the Cleary site. Details of this test are presented in DRAI 1987A.

In general, the results of the pump test demonstrated the directional hydraulic behavior of the Brunswick Formation previously identified by other workers (Vecchioli, 1967; Vecchioli and others, 1969; and Spayd, 1985). As shown in Figure 6, monitoring wells located along strike (MW8D and old production well) with the pumping well (new production well) exhibited drawdowns substantially greater than those observed in monitoring wells located perpendicular to strike (MW3D and MW9D). This information indicates that the greatest transmissivities occur in a direction parallel to the strike of the formation.

In addition, water level measurements collected from shallow monitoring wells during the pump test exhibited very little to no response indicating that there is poor hydraulic connection between shallow bedrock (less than 60 feet below land surface) and the deeper bedrock deposits. The lack of response of the shallow monitoring well water levels during the pump test precluded a determination of the hydraulic characteristics of the shallow bedrock.

In order to develop information on the hydraulic characteristics of the shallow bedrock, slug tests were performed on three shallow monitoring wells at the Cleary site on March 22, 1988. Slug test data were interpreted using the analytical method developed by Bouwer and Rice (1976) in which the hydraulic conductivity of the formation opposite the screen interval is determined by measuring the water level recovery in a well following the instantaneous addition or removal of a solid slug. Slug testing results are presented in Appendix B. Hydraulic information developed from slug and pump tests are shown in Figures 3 and 5.

A comparison of the hydraulic conductivities (permeabilities), transmissivities (the product of the hydraulic conductivity and saturated thickness of the aquifer) and storage coefficients developed for the aquifer testing of the shallow and deeper bedrock are presented below.

Shallow Monitoring Well	Deeper Monitoring Well	Hydraulic Conductivity	Transmissivity	Storage Coefficient
MW2	—	4.62×10^{-2} ft/day	2.15 ft^2/day	—
MW8	—	1.91×10^{-2} ft/day	9.75×10^{-1} ft^2/day	—
MW9S	—	3.04×10^{-2} ft/day	1.12 ft^2/day	—
—	MW3D	1.90 ft/day	175 ft^2/day	6.41×10^{-3}
—	MW8D	4.75 ft/day	221 ft^2/day	1.21×10^{-3}
—	Old Production Well	1.15 ft/day	245 ft^2/day	6.68×10^{-3}

The hydraulic information presented indicate that the hydraulic conductivities and transmissivities for the deeper bedrock are at least two orders of magnitude greater than those for the shallow bedrock.

2.2.4 Horizontal Ground-Water Flow Rates

Horizontal ground-water flow rates for the shallow and deeper bedrock were estimated utilizing hydrogeologic information collected during this investigation. Horizontal ground-water flow rates were calculated using horizontal gradients, average hydraulic conductivities, and assuming an average effective porosity of 0.1 (10%) based on published information (De Wiest, 1969; Freeze and Cherry, 1979).

It is important to note that ground-water flow rates reported do not directly correlate to the migration rate of contaminants. The rate of contaminant migration can be more or less than the ground-water flow rate, depending upon chemical solubilities and adsorption characteristics.

A comparison of horizontal ground-water flow rates calculated are presented below.

Bedrock Interval	Average Hydraulic Conductivity (ft/day)	Range of Horizontal Flow Gradients (ft/ft)	Average Effective Porosity	Range of Horizontal Flow Rates (ft/day)
Shallow Bedrock	3.19×10^{-2}	0.024–0.1	0.1	0.008–0.032
Deeper Bedrock	2.6	0.006–0.007	0.1	0.16–0.18

As shown above, shallow horizontal flow rates are approximately an order of magnitude less than flow rates for the deeper bedrock.

3.0 GROUND-WATER QUALITY

An assessment of site-wide ground-water quality conditions was performed and incorporates ground-water quality information developed from five additional monitoring wells that were recently installed at the site. An earlier assessment of ground-water quality conditions was presented in DRAI 1987A. An assessment of ground-water quality data developed during the January and June 1988 sampling efforts, which include water quality data for the five recently installed monitoring wells (MW8S, MW10S, MW11S, MW11D and MW13S) was performed to refine DRAI's understanding of ground-water quality conditions at the site. This assessment focuses primarily on defining the extent and magnitude of ground-water contamination for purposes of determining the optimum design of a ground-water recovery system.

Ground-water samples collected during the January 1988 sampling round as part of the NJPDES quarterly compliance, were analyzed for the following parameters.

- Priority Pollutant volatile organic compounds (VOCs) plus non-targetted library search of 15 peaks
- Priority Pollutant pesticides
- Total metals including arsenic, cadmium, copper, iron, magnesium, mercury and sodium
- pH
- Oil and Grease
- Total suspended solids (TSS)
- Total dissolved solids (TDS)
- Total kjeldahl nitrogen
- Ammonia nitrogen
- Nitrate nitrogen
- Total phosphorus
- Ortho phosphate phosphorus
- Chemical oxygen demand (COD)
- Biochemical oxygen demand (BOD), 5 day

In order to supplement the January 1988 ground-water quality data base, preliminary ground-water quality data were developed for recently installed monitoring wells MW8S, MW10S, MW11S, MW11D and MW13S during June 1988. Water samples collected during the June sampling round were analyzed for the following compounds.

- Priority Pollutant List VOCs + 15
- Total metals including arsenic, cadmium and mercury

Results of the January and June 1988 ground-water sampling rounds are shown in Appendices C and D, respectively, and are summarized in Table II.

The ground-water quality results developed during these two sampling rounds are compared at face value, although these data were developed six months apart. These results include chemical data for the recently installed

monitoring wells which was developed in a timely manner for inclusion in this report. These data will be confirmed during the upcoming July 1988 quarterly ground-water sampling effort which will include synoptic sampling of all existing and newly installed monitoring wells.

3.1 Shallow Ground-Water Quality

VOCs are the predominant contaminants detected in ground water at the site (Table II). Moreover, carbon tetrachloride and benzene generally account for more than 95% by mass of the VOC constituents detected. Additional organics detected in shallow ground-water samples collected during the January and June 1988 sampling and during previous sampling efforts are as follows.

- chloroform
- toluene
- methylene chloride
- trimethyl benzene
- ethyl methyl benzene
- chlorobenzene
- xylenes
- 2,4-D (pesticide)

Arsenic was detected at levels exceeding the Primary Drinking Water Standard of 50 ppb in five wells. Mercury was detected on one occasion at MW3S at a level (2.3 ppb) exceeding the 2 ppb standard.

The distribution of ground-water contamination in the shallow bedrock is depicted by total VOC distributions (Figure 7). The greatest concentrations of VOCs were detected in wells located within the manufacturing area (well 3S) and southwest of the still area (MW6, MW7 and MW10S). The configuration of the contaminant plume, based on contoured VOC concentrations shown in Figure 7, suggests that the plume extends toward the southwestern property boundary where well MW10S and MW10D are located.

A comparison of the distribution of benzene and carbon tetrachloride concentrations in shallow ground water, as shown in Figure 8, indicate that the VOC plume is comprised of two plumes, i.e., a carbon tetrachloride plume emanating from the vicinity of the old chemical lagoon and leaching field, and a benzene plume emanating from the still area. In addition, Figure 8 shows that the wider distribution of benzene appears to indicate that this compound is more mobile than the carbon tetrachloride and is probably the contaminant that defines the leading edge of the VOC plume.

This relationship is confirmed by published information on the mobile characteristics of the two contaminants. Benzene is reported to have a slightly greater aqueous solubility (1,780 mg/L vs. 800 mg/L) and a slightly lower Log Octanol/Water Partition Coefficient (2.31 Log Kow vs. 2.64 Log Kow) than does carbon tetrachloride. High solubilities and low Log Octanol/Water Partition Coefficients indicate greater mobility.

Based on the water quality data developed to date at the site, DRAI cannot confidently determine the precise distance that the shallow benzene plume (which defines the leading edge of the VOC plume) has migrated. However, a preliminary, qualitative estimate can be made using a horizontal ground-water flow rate of 0.026 feet per day, which is estimated using hydraulic information for the still area. Assuming a worst-case scenario, contamination may have first entered this portion of ground-water at the site approximately 40 years ago (chemical manufacturing operations began in 1948). Based on this scenario it is estimated that the benzene plume, which will likely define the leading edge of the VOC plume, may have migrated approximately 380 feet southeast of the still area (source area). This estimate is considered qualitative because ground-water flow rates do not directly correlate to the migration rate of the contaminants.

3.2 Deeper Ground-Water Quality

Benzene and carbon tetrachloride are also the primary VOCs detected in ground water in the deeper bedrock. In addition to these two compounds, other organics detected previously in ground water collected from the deeper monitoring wells, are as follows:

- Chloroform
- Toluene
- 2,4-D (pesticide)
- ethylbenzene
- 1,1,2-trichloroethane

In addition, concentrations of arsenic have been detected at levels exceeding the 50 ppb Primary Drinking Water Standard.

The distribution of total VOCs in the deeper ground water during January and June 1988 is presented in Figure 9. As in the shallower aquifer, total VOC concentrations are used as an indicator of the aerial extent of ground-water contamination.

Ground-water contamination in the deeper bedrock is significantly less in magnitude and extent when compared with overlying shallow ground-water contamination (Figure 9). The maximum total VOC concentration detected in ground water in the deeper bedrock (3,300 ppb at MW10D) is approximately two orders of magnitude less than the maximum concentrations detected in the overlying shallower bedrock (Figure 7). The distribution of total VOC concentration shown in Figure 9 indicates that the lateral extent of VOCs in the deeper bedrock at the site is generally limited to those areas where ground water in the overlying shallow bedrock contains relatively high concentrations of VOCs. These areas are: (1) the old chemical lagoon and leachate field area; and (2) the area southwest of the still.

The deeper VOC plume appears to be elongated in a manner that is parallel with the approximate northeast strike of the Brunswick Formation and not in the preferred southeast direction of ground-water flow for the deeper

bedrock (Figure 5). Therefore, it appears that the migration of contaminants in the deeper bedrock is controlled primarily by the structural expression (i.e., strike and dip) of the bedrock rather than the preferred direction of ground-water flow.

The distribution of the deeper VOC plume indicates that elevated concentrations of VOCs have likely migrated toward the southwest property boundary. An estimate of the distance that the VOC plume has migrated cannot be determined because based on static ground-water flow patterns (Figure 5), there is no gradient in a direction parallel with the axis of the deeper ground-water contaminant plume.

4.0 DESIGN OF A GROUND-WATER RECOVERY SYSTEM

The objective of a ground-water remedial system for the W.A. Cleary site is to intercept ground water migrating toward the property boundary and at locations where ground-water contamination is at the highest concentrations. Remedial alternatives for off-site contaminated ground water cannot be determined at this time.

The purpose of the ground-water recovery systems described in this section is to capture and remove contaminated ground water, which contains elevated concentrations of a limited number of VOCs, arsenic and pesticides in the underlying aquifers at the Cleary site. Evaluation and analyses presented in this section are limited to that portion of the remedial system actively involved in the withdrawal of ground water. Discussions on the actual design of an appropriate on-site treatment system will be developed by DRAI and its subcontractors. The treatment system will address the type of parameters to be removed from the ground water, the available treatment methods and the order of treatment (i.e., VOC, pesticide and arsenic).

Hydraulic design considerations, and preliminary numerical modeling results are discussed in the following sections.

4.1 Hydraulic Design Considerations

The evaluation of the ground-water remedial plan is limited by the following constraints:

- multiple aquifer units underly the site and exhibit different head elevations, flow directions, hydraulic conductivities and well yields.
- extremely low well yields are anticipated for the shallow and the deeper aquifers (0.05 and 2 gpm/well, respectively).
- multiple contaminants are present requiring different methods of treatment.
- two separate VOC plumes (benzene and carbon tetrachloride) are identified by type of compound and their potential sources.

On the other hand, and due to the low hydraulic conductivities of the bedrock aquifers, most of the ground-water contamination is confined to the Cleary site and is migrating toward the southwestern property boundary.

Two technical alternatives were considered to capture and recover contaminated ground water from the shallow and deeper bedrock aquifers underlying the site. The first approach involves the installation of a collection trench containing high permeability material which is capable of efficiently propagating the drawdowns associated with pumping from a limited number (i.e., 2 to 3) of ground-water collection sumps, across the entire extent of the trench.

This approach was not considered suitable for application at the site for the following reasons.

- A trench cannot be dug to depths greater than 25 feet below grade using standard backhoe equipment.

- The trench would have to be excavated into shale bedrock which is competent at depths of greater than 15 feet below land surface.

The second technical approach evaluated is the installation of a line of single pump recovery wells in which the cones of influence generated by the pumping of each well produces a hydraulic barrier to contaminant migration. The line of recovery wells will create a hydraulic barrier across the plume of contamination. This approach is better suited for site conditions because shallow wells (approximately 45 feet deep) and deeper wells (approximately 120 feet deep) can be easily installed in areas where ground-water recovery is contemplated. However, well yields and the resultant area of the cone of pumping will dictate well spacing and the total number of wells required.

4.2 Approximate Locations of Ground-Water Recovery Wells

The following areas have been selected to recover shallow and deeper ground-water contamination near the leading edge of the contaminant plume and in the area of its apparent greatest concentration. (Figures 10 and 11):

(1) Along the southwestern property boundary.
(2) The area near the old chemical lagoon and leaching fields (near well cluster #3) where elevated concentrations of VOCs (carbon tetrachloride) have been observed (Figure 9).

A primary concern in selecting the approximate location and spacing of the recovery wells in each area is to effectively intercept and recover contaminated ground water. This concern is based upon the number of wells necessary to intercept the flow of contaminated ground water and to optimize the time needed for aquifer remediation.

In order to select the optimum location, well spacing and pumping rate for the recovery wells, an analytical model of the shallow and deeper aquifer was used to simulate ground-water flow during recovery well pumping. This model provides a first-order approximation of aquifer response in the vicinity of the proposed recovery well system, to the external stresses induced by pumpage.

The analytical model (Theis Well Field Model), developed by Prickett, simulates ground-water flow conditions based on the Theis equation for ground-water flow.

The model was calibrated to simulate steady-state flow conditions at the site. Once the steady-state model was calibrated, a simulation representing the effects of the pumping recovery well system was performed. The ground-water recovery well system effect was simulated by assigning discharge values to several contiguous nodes. Discharge rates (yields) assigned to each shallow pumping well equaled 0.05 gallons per minute (gpm) and discharge rates for the deeper pumping rates equaled 2.0 gpm each. The resulting output data (i.e., distribution of head elevations) was contoured to illustrate the configuration of the shallow and deeper systems after a

specified period of pumping (one year). The theoretical configuration of ground-water elevations in the shallow and deeper bedrock during pumping conditions is shown in Figures 10 and 11, respectively.

The contoured output of the model simulation for the shallow bedrock indicates that a "picket fence" of pumping (at 0.05 gpm each) recovery wells (RW1 to RW10), spaced at approximately 50-foot intervals and located in a line oriented perpendicular to the general northwest strike of the Brunswick Formation will propagate a cone of influence (i.e., capture zone) that will effectively intercept and capture contaminated ground water migrating southwestward from the chemical plant toward the property boundary (Figure 10). In addition, Figure 10 illustrates that ground-water flow in the area directly south of the line of pumping wells is reversed during pumping conditions, therefore, locally capturing ground-water downgradient (off-site).

In addition, approximately four recovery wells (RW11-RW14) are also contemplated in the area near well cluster MW3, where ground water exhibits the greatest concentrations of carbon tetrachloride. These wells will likely be aligned perpendicular to strike in a manner similar to the recovery well system proposed along the property boundary (Figure 10). Due to limitations in the analytical model, a simulation of the effects of pumping of proposed recovery wells RW11-RW14 could not be performed.

As shown in Figure 11, the pumping of four deeper recovery wells, two located along the southwestern property boundary (RW17 and RW18) and two located near the chemical plant (RW15 and RW16) will effectively capture contaminated ground water migrating through the deeper bedrock at the site. This would be accomplished by pumping each deeper recovery well approximately two gallons per minute each (a total of eight gallons per minute). The actual cone of depression developed from the pumping of each recovery well would likely be more elliptical than shown in Figure 11, reflecting the directional transmissivity of the Brunswick Formation. Therefore, it is anticipated that the pumping of four deeper recovery wells may influence a larger area (i.e., propagate a larger capture zone) than is shown in the simulation (Figure 11).

In order to reduce arsenic concentrations in water recovered at each well, recovery wells will be constructed with a gravel pack and well screen to reduce turbidity of ground water entering the well. Previous experience at the site indicates that arsenic associates (sorbs) with the sediment, therefore, reducing the turbidity of pumped water will reduce concentrations of arsenic.

Based on calculations of the contaminated ground-water volume stored beneath the Cleary site and the assigned pumping rates of the recovery system, it is estimated that between 4 and 10 years will be required for the removal of "one volume" of contaminated water from the deeper and the shallow aquifers, respectively. In addition, these low pumping rates are not compatible with the treatment system now under consideration since either air stripping or activated carbon columns require continuous flow conditions. Therefore, DRAI is presently considering methods for well yield enhancement or the addition of wells to increase pumping rate (and volume) which will reduce the remediation time.

5.0 SUMMARY OF CONCLUSIONS

The following conclusions are based on DRAI's comprehensive evaluation of hydrogeologic and ground-water contaminant conditions at the Cleary site.

Geology

(1) The W.A. Cleary site is underlain by the Brunswick Shale, which is comprised of a fractured shale with some interbedded sandstone. Locally, bedrock strikes at approximately north 45° east and dips at approximately 5° to 10° west.

Hydrogeology

(2) Based on site-specific hydraulic and contaminant information, the bedrock underlying the Cleary site is divided into:
   (a) Shallow bedrock (10 to 60 feet below land surface)
   (b) Deeper bedrock (60 to 120 feet below land surface)
   (c) Deep bedrock (of undefined depth, however, greater than 120 feet below land surface)

(3) Ground water in the shallow bedrock is under water-table conditions with depth to water varying from approximately 4 to 22 feet below land surface. Ground water in the deeper bedrock is under semi-confined conditions with depth to water ranging from 18 to 30 feet below land surface.

(4) Head differences measured at five existing well clusters indicate a naturally occurring downward vertical gradient.

(5) Ground-water flow patterns in the shallow bedrock are defined by a localized ground-water mound centered beneath the chemical plant area. Locally, ground-water flow is radially away from the mound.

(6) Ground-water flow in the deeper bedrock reflects regional conditions and is in a southeasterly direction.

(7) Hydraulic conductivities and transmissivities for the deeper bedrock are at least two orders of magnitude greater than those for the shallow. In addition, pump test information indicates that the deeper bedrock is more transmissive in a direction parallel with the strike of the Brunswick Formation. The anticipated well yields for the shallow and deeper aquifers are 0.05 gpm and 2 gpm per well, respectively.

Ground-Water Quality

(8) VOCs (primarily benzene and carbon tetrachloride) and to a lesser extent, arsenic, the pesticide 2,4-D and mercury (detected at one well on one occasion only) have been detected in ground water underlying the Cleary site.

(9) VOCs are predominant and define the extent of the contaminant plume. Arsenic, mercury and 2,4-D have only been detected in ground water in monitoring wells located near the chemical plant and the former chemical lagoon.

(10) The shallow bedrock ground-water contaminant plume is actually comprised of two plumes, i.e., a benzene plume emanating from the still area and the carbon tetrachloride plume emanating from the old chemical lagoon and leaching field area.

(11) Benzene appears to be more mobile than carbon tetrachloride and is defining the leading edge of the contaminant plume in a westerly direction.

(12) The deeper bedrock ground-water contaminant plume is smaller than the overlying shallow plume and is elongated in a direction parallel with the strike of the Brunswick Formation. In cluster wells where VOC's were detected, the reduction in VOC's between the shallow aquifer and the deeper aquifer is at least 50 fold.

(13) Contaminant migration in the deeper bedrock appears to be controlled primarily by the structural expression of the bedrock rather than ground-water flow patterns.

Remediation

(14) A system of pumping recovery wells, located along the southwestern property boundary and near the old chemical lagoon and chemical plant area, are best suited to mitigate shallow and deeper contaminated ground water migrating southwest of the still area and in an area of the plume containing the greatest carbon tetrachloride concentrations.

(15) The shallow well system will consist of ten wells (RW1 - RW10), spaced at 50 foot intervals along the southwest property boundary and approximately four wells (RW11 - RW14) located near well cluster number MW3. It is anticipated that average well yield will be about 0.05 gpm.

(16) The deeper well system will consist of two recovery wells (RW16 and RW17) located along the southwestern property boundary, and two wells (RW15 and RW17) located near well cluster MW3, with each well pumping at a rate of approximately 2 gpm.

(17) The installation of shallow and deeper recovery wells near well cluster MW3 will be delayed until soil remediation (removal) is completed in this area in order to avoid potential damage to the recovery well system.

6.0 RECOMMENDATIONS

As a result of DRAI's evaluation of hydrogeologic and ground-water contaminant conditions at the W.A. Cleary site, DRAI recommends the following additional work be performed to support the final design and location of a ground-water remedial system.

(1) The old and new production wells should be included in the ongoing quarterly ground-water monitoring program in order to monitor the deeper bedrock ground-water quality in the northeast portion of the facility.

(2) The shallow and deeper aquifers will be modeled using a two-dimensional numerical model in order to confirm the proposed location, spacing and design of ground-water recovery wells for the site.

(3) Well yield enhancement technologies, including hydraulic fracturing, will be investigated to determine if suitable and or desirable for use at the Cleary site as part of remedial efforts. This should result in an increased well yield for the shallow aquifer.

(4) Based on the most recent ground-water quality data (June 1988), it is probable that off-site migration of contamination has occurred. Therefore, we recommend three additional monitoring wells (two shallow and one deep) for purposes of further delineation.

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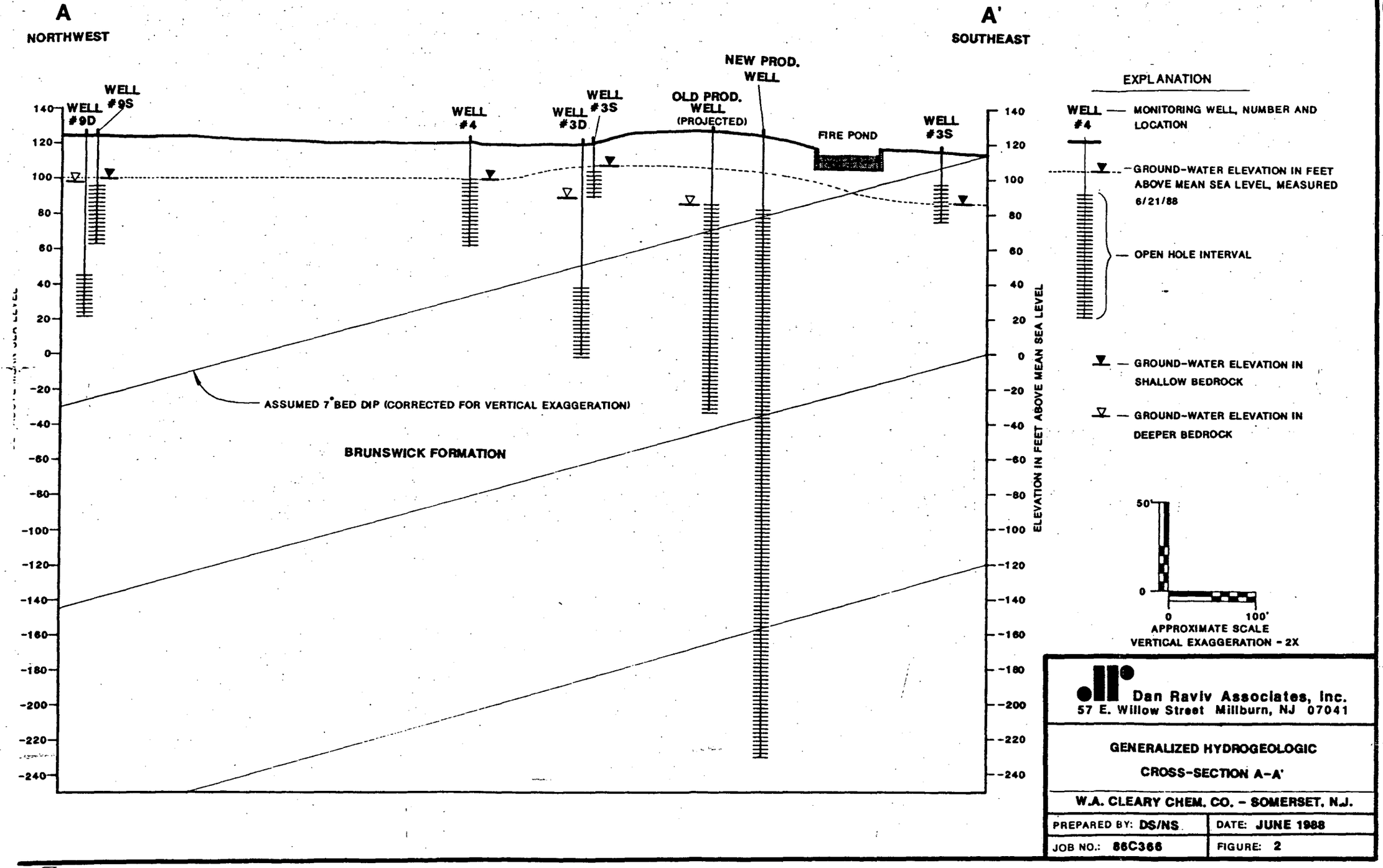
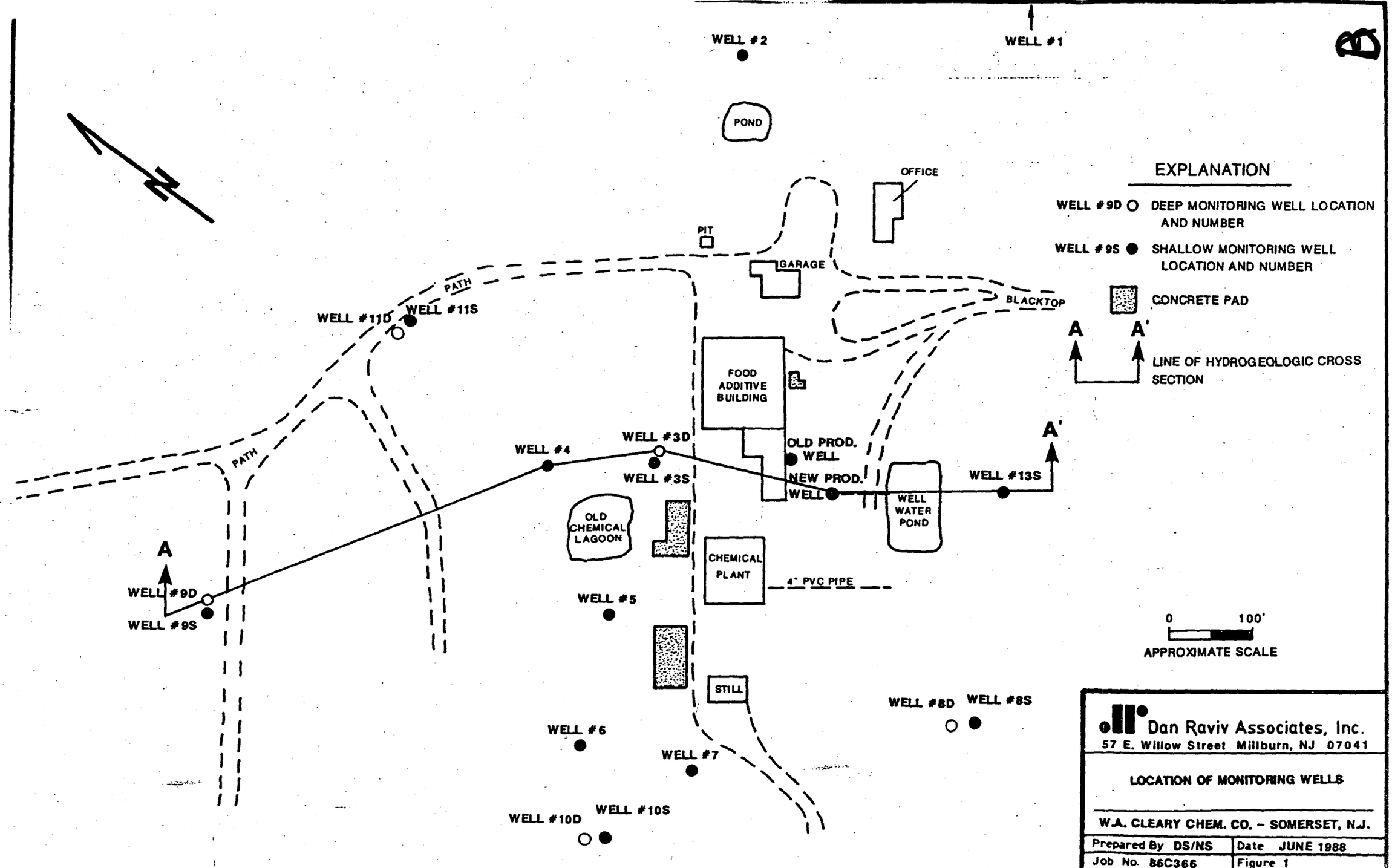


Dan Raviv Associates, Inc.
57 E. Willow Street Millburn, NJ 07041

GENERALIZED HYDROGEOLOGIC CROSS-SECTION A-A'

W.A. CLEARY CHEM. CO. - SOMERSET, N.J.

PREPARED BY: DS/NS	DATE: JUNE 1988
JOB NO.: 86C366	FIGURE: 2

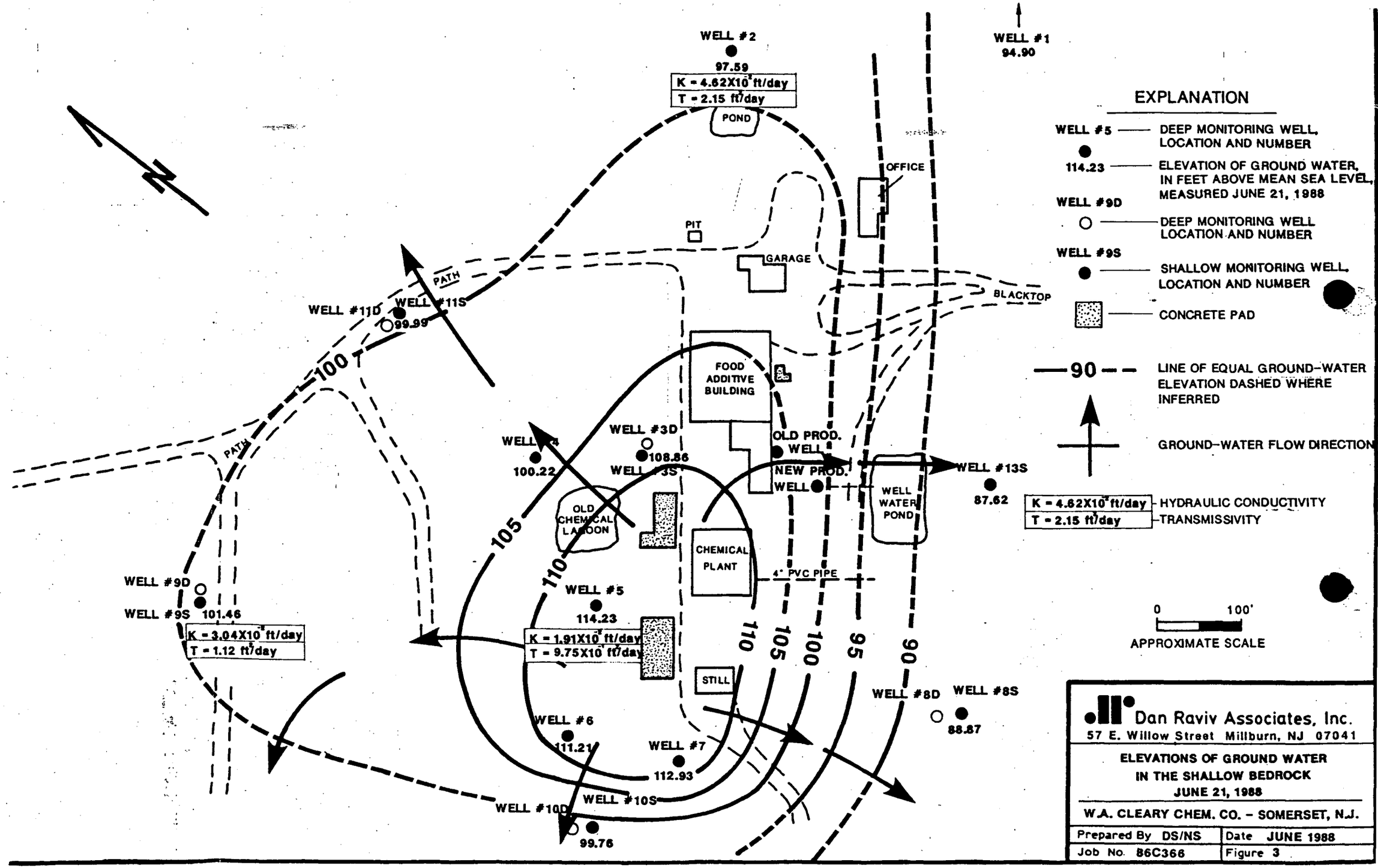


Dan Raviv Associates, Inc.
57 E. Willow Street Millburn, NJ 07041

LOCATION OF MONITORING WELLS

W.A. CLEARY CHEM. CO. – SOMERSET, N.J.

Prepared By DS/NS	Date JUNE 1988
Job No. 86C366	Figure 1



Dan Raviv Associates, Inc.
57 E. Willow Street Millburn, NJ 07041

ELEVATIONS OF GROUND WATER IN THE SHALLOW BEDROCK JUNE 21, 1988

W.A. CLEARY CHEM. CO. – SOMERSET, N.J.

Prepared By DS/NS	Date JUNE 1988
Job No. 86C366	Figure 3

B

W·A·CLEARY CHEMICAL CORPORATION

P. O. Box 10, 1049 Somerset Street
Somerset, N. J. 08873 (201) 247-8000

November 2, 1987

New Jersey Department of Environmental Protection
Division of Water Resources
Bureau of Ground Water Quality Management
401 East State Street
Trenton, New Jersey 08625

Attention: Mr. Robert Berg, Chief
Mr. Steven Anderson, Geologist

Re: Responses to NJDEP's Comments on the
Hydrogeological and Soil Investigation
W.A. Cleary Chemical Corp. (Cleary)
Somerset, New Jersey 08873
DRAI Job No. 86C366

Gentlemen:

The purpose of this letter is to reply to your letter, which was dated September 18, 1987 and addressed to the Cleary Corp.. In the letter you requested additional information on past waste disposal practices and provided comments on Dan Raviv Associates, Inc's (DRAI's) Hydreologic and Soil Investigation Report of April 1987. Our comments on past waste disposal practices is presented in this letter and an enclosed letter from DRAI presents their reply to your comments on their hydrogeological report.

1. Past Waste Disposal Practices

Soil and groundwater contamination on the site have been associated with the activities of the agricultural chemical manufacturing facilities and its quality control laboratory. These activities started in 1946.

Agricultural chemical manufacturing operations have been performed in the chemical plant since 1946, and in the area designated as the still during the period from 1946 to 1977. The quality control laboratory was always located in the chemical plant.

ATTACHMENT C

W.R. CLEARY CHEMICAL CORPORATION

A. Past Manufacturing Practices

A.1 Still Area

The areas of the still was an open, roofed structure which covered two manufacturing systems. These systems were used in the production of phenulmercuric acetate (1946-1977), phenylmercuric oleate (1960-1965), mercuric napthenate (1960-1965), and disodium methyl arsonate (1968-1969). The raw materials used for these manufacturing operations are known and consisted of the following ingredients:

1. Acetic anhydride received in 55 gallon drums
2. Aqua ammonia received in 55 gallon drums
3. White arsenic powder received in fiber container
4. Benzene received in tanktruck quantity and off loaded into 55 gallon drums
5. 50% caustic soda solution received in 55 gallon drums
6. 2 ethyl hexoic acid received in 55 gallon drums
7. Glacial acetic acid received in 55 gallon drums
8. Concentrated Hydrochloric acid received in 55 gallon drums
9. Mercuric oxide received in fiber containers
10. Methanol received in tankwagon quantity and off loaded into an underground storage tank located adjacent to the still area
11. Methyl chloride received in cylinders
12. Oleic acid received in 55 gallon drums
13. 46-spirit (mineral spirits) received in 55 gallon drums

Tank trucks are believed to have been unloaded by the still area on the plant roadway running southwest along the chemical plant to the still. Raw materials were stored outdoors in the area between the chemical plant and the still, and the area north and northwest of the still.

The still area operations were as follows:

The manufacturing operations were batch type, and all operations were subject to weather conditions due to the open, roofed structure housing the operation.

Phenulmercuric Acetate - Glass Lined Reactor System-
Manufacturing Period 1946-1977

After charging mercuric oxide, glacial acetic acid, acetic anhydride and recovered and virgin benzene the reactor contents were heated to the boiling point and vapors reflux for approximately 12 hours. During this reflux period the vapors were condensed/subcooled in a glass double pipe condenser/heat exchanger and recycled back to the reactor. After the reflux period a vacuum was pulled on the reactor and excess benzene and water of reaction were vaporized from the reactor, condensed in the double pipe condenser/subcooler, and the insoluble water phase was collected in 5 gallon glass jug while benzene phase was permitted to flow to a benzene receiver and recovered.

ATTACHMENT C

When the volume of water in the jug became excessive it was drained to a 55 gallon drum. This water was used for makeup water requirements in the chemical plant. After completion of the stripping period aqua ammonia was charged to the reactor to neutralize the acetic acid. The reactor contents was pumped to the chemical plant for further processing.

Phenylmercuric Oleate - Glass Lined Reactor System - Manufacturing Period 1960 - 1965

After charging the reactor with mercuric oxide, 2 ethyl hexoic acid and recovered and virgin benzene the reactor contents were heated to the boiling point and vapors refluxed approximately 12 hours. During this reflux period the vapors condensed/subcooled in a glass double pipe condenser/heat exchanger and recycled back to the reactor. After the reflux period a vacuum was pulled on the reactor and the excess benzene and water of reaction were vaporized from the reactor, condensed in the double pipe condenser/subcooler, and the insoluble water phase was collected in 5 gallon glass jug while the benzene phase was permitted to flow to a benzene receiver and recovered. When the volume of water in the jug became excessive it was drained to a 55 gallon drum. This water was used for makeup water requirements in the chemical plant. After completion of the stripping period 46-spirit (mineral spirits) was charged to the reactor to form a solution of phenyl mercury 2 ethyl hexoate. To this solution oleic acid was added to form the phenylmercuric oleate. The reactor contents were transferred to the chemical plant for further processing.

Disodium Methyl Arsonate - Stainless Steel Reactor System - Manufacturing Period 1968-1969

Disodium methyl arsonate wet cake and solutions were purchased from outside manufacturing companies during the periods before and after the 1½ year production period in the still area. Formulations from the purchased materials were made in the chemical plant. Therefore, the small amount of arsenic trioxide that was purchased and used over the 1½ year period was converted to disodium methyl arsonate (DSMA) and the arsenic contamination found on the site is the nonpoisonous disodium methyl arsonate form and not the poisonous arsenic trioxide form.

Caustic solution and arsenic trioxide from fiber containers are charged to the reactor and react to form sodium arsenite. A vacuum is pulled on the reactor and the reactor is purged with nitrogen. Methyl chloride is charged to the reactor by pumping it from cylinders. A reaction resulted in the formation of a disodium methyl arsonate slurry. The slurry was transferred to a centrifuge located outside and adjacent to the chemical plant. The centrifuge filtrate and solids were collected in drums and transferred to the chemical plant. The liquid filtrate was placed into the chemical plant trough which discharged to the chemical lagoon. The wet cake was used for further processing.

A.2. Area Between the Chemical Plant and the Still

Cadmium Chloride - 55 gallon stainless drums

Cadmium oxide and nitric acid are charged to stainless steel drums which are agitated by a portable mixer. Sodium chloride is then added to the solution. The solution is then transferred to the chemical plant for further processing.

A.3. The Chemical Plant

The chemical plant area is an enclosed masonry building with wooden roofed structure. The building previously housed equipment which was extensively used for the filtration, drying and blending of solids, as well as the present vessels which are used for blending and adjusting. In addition, grinding is presently performed in a ball mill and glass bead mill. Runoff from equipment housed in the building traveled along the pitched floor to a trough which discharged to an underground pipeline which conveyed the waste effluent to the chemical waste lagoon.

The quality control laboratory was housed in the chemical plant. In 1985 the discharges from the laboratory sink was determined to be draining to the septic system along with the sanitary waste from the agricultrual chemical building. The laboratory sink drain line was immediately diverted to the chemical plant trough which discharges to the chemical waste lagoon. It is believed that the original septic system was rebuilt in 1981 in the same location as the existing septic tank/leaching field.

The chemical waste lagoon had a clay bottom for effluent retention. However, on occassion the contents of the lagoon overflowed its bank when the quantity of plant effluent and rainfall was greater than the natural evaporation rate. In 1982 a policy of continual addition to the bank height was initiated and the overflow condition was diminated.

Equipment installed in the chemical plant was used in the production of products from the concentrated phenylmercuric acetate, phenylmercuric oleate, disodium methyl arsonate, cadmium chloride manufactured in the still area, and other agricultural chemicals resulting from blending operations. A list of the chemical products and raw materials handled in the chemical plant are as follows:

A3.a Chemical Products and Associated Blended Products

A3.a1. Phenylmercuric acetate

PMA Powder
PMAS Wet Cake
PMAS 30%
PMAS 10%
PMAS 3%
Apple Spray
Apple Spray & PMAS 10%

ATTACHMENT C

Ethyl Mercuric Acetate
Ethyl Mercuric Acetate 5%
Meroc Concentrate
Mercuric Napthanate 10%
Mildew Clear
Mildew NA25
Niagra Argricultural Spray
Phenyl Mercury Triethanolamine Lactate
Phenyl Mercury Triethanol Ammonium Lactate
PMA EMC Concentrate
PMA - Mica - 50%
PMA 3% and Mildew Clear
Stoma Seal
Phenyl Mercury 24D

A3.a2. Phenylmercuric Oleate

Phenylmercuric Oleate 30%
Phenylmercuric Oleate 10%
Nildew OL 10%
Nildew Na21

A3.a3. Disodium Methethyl Arsonate

DSMA Dried
DSMA Wet Cake
DSMA 65%
Methar 100
Methar 80
Methar 50
Methar 30
Methar 25
AMA 2,4,D
Calcium Methyl Arsonate
Ferric Methyl Arsonate
Methyl Arsonic Acid
Super Methar AMA

A3.a4. Cadmium Chloride

Caddy
Seacoast Caddy

A3.a5 General Blended Products

All Wet
Bracto Clear
Broad Spectrum Fungicide
Bromosan 3336
Cadtrete
Celeste Powder

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ClearSpray
Cure It
Grass Greenzit
Herbicide 1662
Limestone F
MCPP
MCPP 2½%
MCPP 2,4,D
Needlefast
No Slyme
Preservit 3,5,D
Snow Chek
Spectro
Spotrete F
Spruce Up
Super Mildew Clear
Sulfur F
Thimer
Tinsel
Tinsel Blue
Tinsel Pink
Tree Greenzit
TruGreen

A3.b. Ingredients Associated with Finished Products

Accopence Toluidine Red
Agro Gro
All Wet
Alpine Oil
Amsco Solvent D-80
Aqua Ammonia
Acqua Gro
Attazord
Attaclay
Bacto Clear
Bardac
Cab O Soil
Cadmium Oxide
Cadmium Chloride
Calcium Carbonate
Calcium Chloride
Calcium Methyl Arsonate
Carbon Disulfide
Caustic Potash
Caustic Soda 50%
Charcoal
Citric Acid
Clay
Dimethyl Amine

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Disodium Phosphate
Diethanolamine
DSMA - Ansar 8100
Dupanol
Dyrene
Ethyl Mercurial Acetate Solution
Ferri Floc
Ferrous Sulfate
Glacial Acetic Acid
Heliogar Blue
Hi Sil 233
Hyamine
Hydrochloric Acid
Hydorgen Peroxide
Igepal CO 630
Isopropanol
Lactic Acid
Magnesium Oxide
Mercuric Oxide
Methanol
MCPP
Mineral Spirits
Mica
Monoethanol Amine
Monomethyl Amine
Monosodium Methyl Arsonate
MSMA O Ansar 170
Nitric Acid
Oleic Acid
Paraformaldehyde
Permagen Yellow
Phenyl Mercurial Benzoate
Pigment, Black
Pigment, Blue
Pigment, Green
Pigment, Yellow
Primene 81R
Propylene Glycol
Rhoplex
Snow Chek
Sodium Nitrate
Sodium Sulphate
Solvent D-80
Stabiloid White
Sulfuric Acid
T Octyl Amine
Talcum Powder
Thiram
Topsin E
Tri Butyl Tin Oxide
Triethanol Amine
Triton X-120
Vancide
2 Ethyl Hexoic Acid
2,4,D Acid
2,4,D Amine (Dow 2,4 Formula 40)
46 Spirit

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W-A CLEARY CHEMICAL CORPORATION

Currently, the chemical plant is used to blend and package solid and liquid ingredients which are purchased from chemical suppliers. The plant produces liquid and flowable liquid agricultural chemical products. No longer is there any manufacturing on site.

B. Past Waste Disposal Practices

The source of soil and groundwater contamination are the still area and the chemical plant area. The chemical operations in the still area, at best were difficult due to weather conditions. This type of operation undoubtedly resulted in accidental spills which discharged from the area to the immediate ground surface adjacent to the area. The phenylmercuric acetate solution was manufactured over a 31 year period (1946-1977), the phenyl mercury oleate was manufactured over a 5 year period (1960-1965), and the disodium methyl arsonate was manufactured over a 1½ year period (1968-1969). The contaminants from these operations which consist of the finished product and raw materials which were discussed in above paragraph 1A, when accidently spilled, flowed on the ground along the ground surface contour, and into the soil.

The presence of a former lagoon east of the still has been denied by company officials and by a chemical operator who has been employed by the company since 1969 and was involved with the operation in this area. Rain run-off from the side of the slanted metal roof, is believed to have caused a depression in the area as there was never a constructed lagoon at this location.

We have assumed that heavy mercury concentration found in this location is due to discarding of the empty mercuric oxide fiber containers. If the containers were not immeidately removed and were subject to weather conditions any residual mercury content in the container could have been washed to the ground surface.

Soil contamination along the tree line in the area north and northeast of the chemical plant is due to allowing the chemical plant lagoon to overflow. The content of the chemical lagoon could consist of all the finished products and raw materials listed in above paragraph 1C. Overflow from the lagoon was due to the combination of rainfall and effluent discharge from the chemical plant which was greater than normal evaporation from the chemical waste lagoon.

During the period of operations in the still area, PMA solids filtration and wet cake washing was employed for 2½ years in the chemical plant. The water wash was recovered to a minimal phenylmercuric acetate content of 0.5%. However, excess washwater was allowed to flow to the plant trough and ultimately to the chemical lagoon. After this period the wet cake was purchased from outside manufactureres. In addition, the washing of tanks, plant walls and

ATTACHMENT C

W.A. CLEARY CHEMICAL CORPORATION

floors, and spills to the floor surface flowed to the trough which ultimately discharged to the chemical lagoon and added to the chemical composition in the lagoon. The lagoon overflowed on rare occasions during excessive rain, to the ground surface adjacent to all sides of the lagoon and flowed along the ground surface on all sides of the lagoon.

Sanitary waste from the food and chemical plants discharge to the septic system. In addition, until 1985 the laboratory sink discharged to the septic tank. It can therefore be assumed that even though plant production samples, which were very small in quantity (4oz. jars) were returned to the chemical plant operations, the ability existed for some of the finished products and raw materials listed in the above paragraph A1 and A3 to have entered the septic tank and contaminants would have flowed from it to the leaching field. Other than by runoff from the chemical plant lagoon, this is the only means by which contaminants could have entered the septic leach field.

Attached Figures 1, 2, and 3 present an overall site plan, and the location of soil sampling points and their analytical results in relationship to known disposal areas. As the quantity of waste effluent leaving the manufacturing areas over the forty-one year manufacturing history is unknown, Figures 2 and 3 have depicted the analytical results of sampling at the various soil depths and the direction of runoff from the disposal areas.

Attached Figure 4 is a process drawing of the discharge to the septic tank/septic leach field. In summary, sanitary wastes flowed to the septic tank from both plants and the drain from the laboratory sink in the chemical plant. These are the only discharges to the septic tank. The laboratory sink discharges was stopped in 1985 when it was discovered.

A more technical and detailed response will be furnished the NJDEP with the soil cleanup plan, the ground water remediation plan which is being prepared by DRAI. These will be submitted to the NJDEP during November, for review and approval, as indicated in the DRAI letter.

It is not our intention to have either one of us to spend time in writing and therefore, we have scheduled a meeting on November 23, 1987 to discuss the contents of the letters mentioned in this last correspondence. We are as anxious as you are to initiate this program in a logical and organized fashion consistent with your request and available funds. We hope that the response in these letters meet with your approval.

If you have any questions or need additional information, please call.

Very truly yours,

Louis G. Ricciardi

Louis G. Ricciardi
Chief Executive Officer

ATTACHMENT C

W.R. CLEARY CHEMICAL CORPORATION

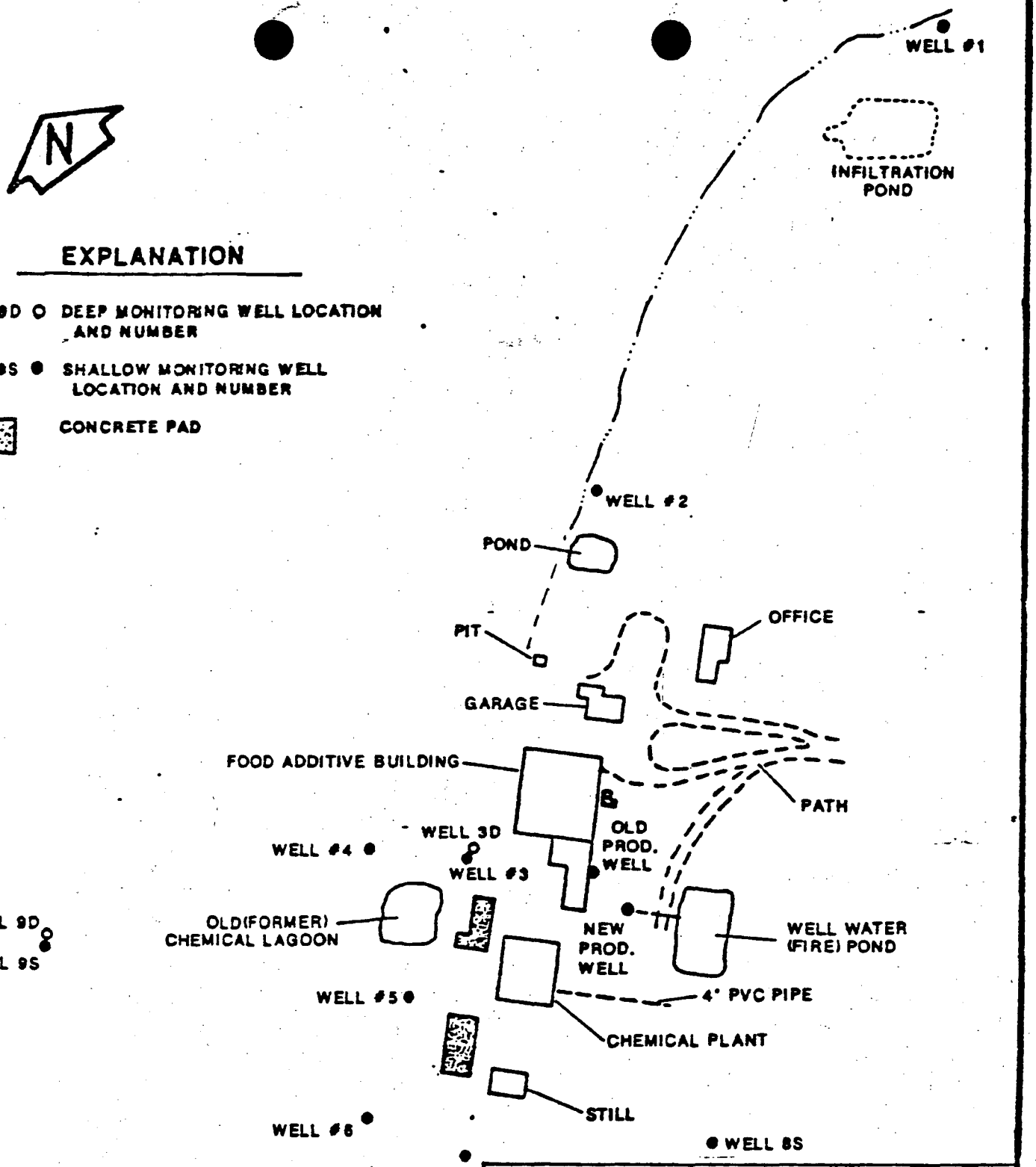
LGR/paf

Enclosures

DRAI letter to NJDEP
Fig. 1. Site Map
Fig. 2. Site Map - Soil Sampling Locations
Fig. 3. Site Map - Soil Sampling Locations
Fig. 4. Process Flowsheet - Septic tank system

cc: Steve Picco, Esq.
Dan D. Raviv, Ph.D.

ATTACHMENT C



W.A. CLEARY CHEM. CO.

1049 SOMERSET STREET, SOMERSET, N.J. 08873

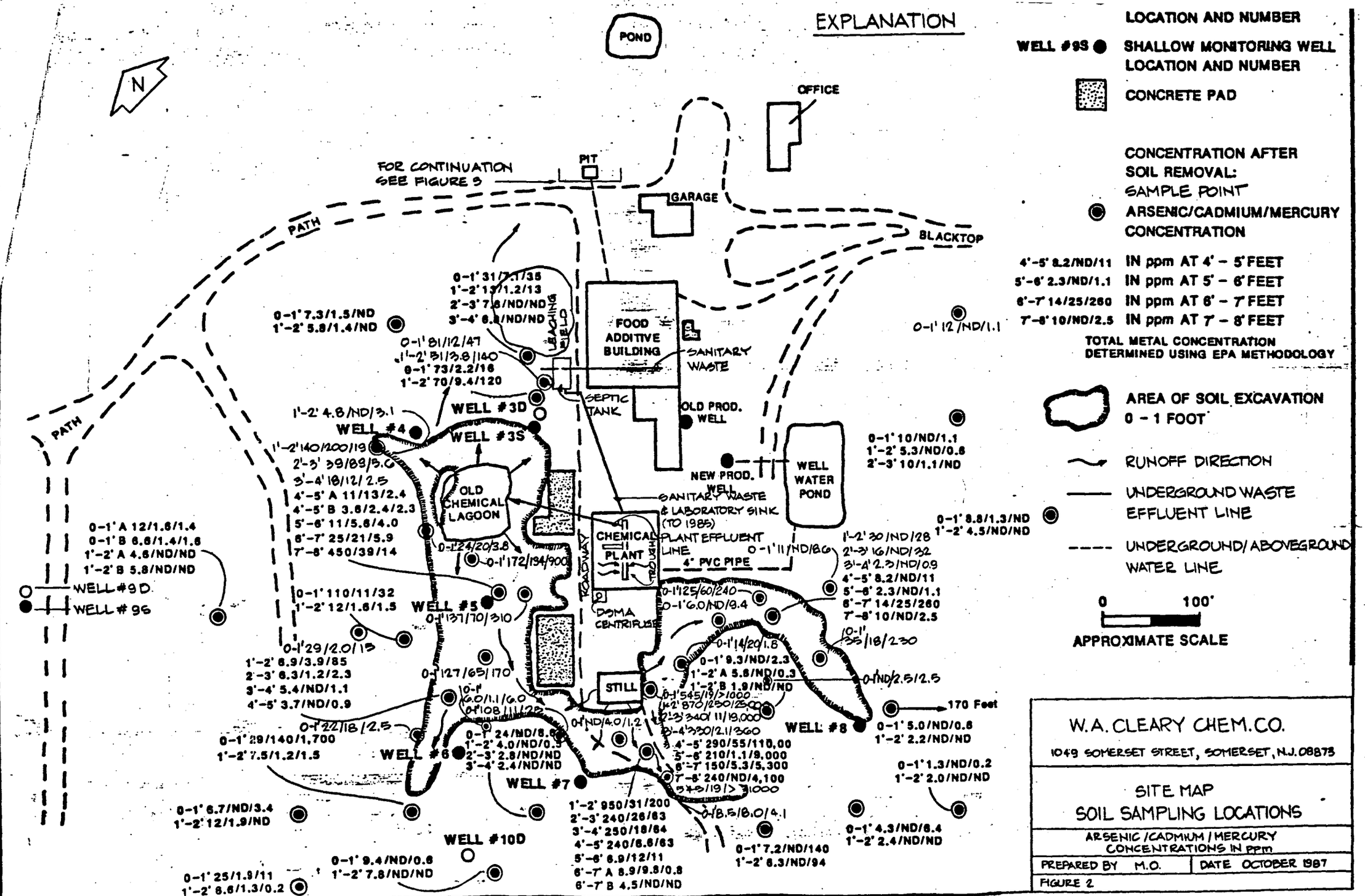
SITE MAP

ARSENIC / CADMIUM / MERCURY CONCENTRATIONS IN ppm

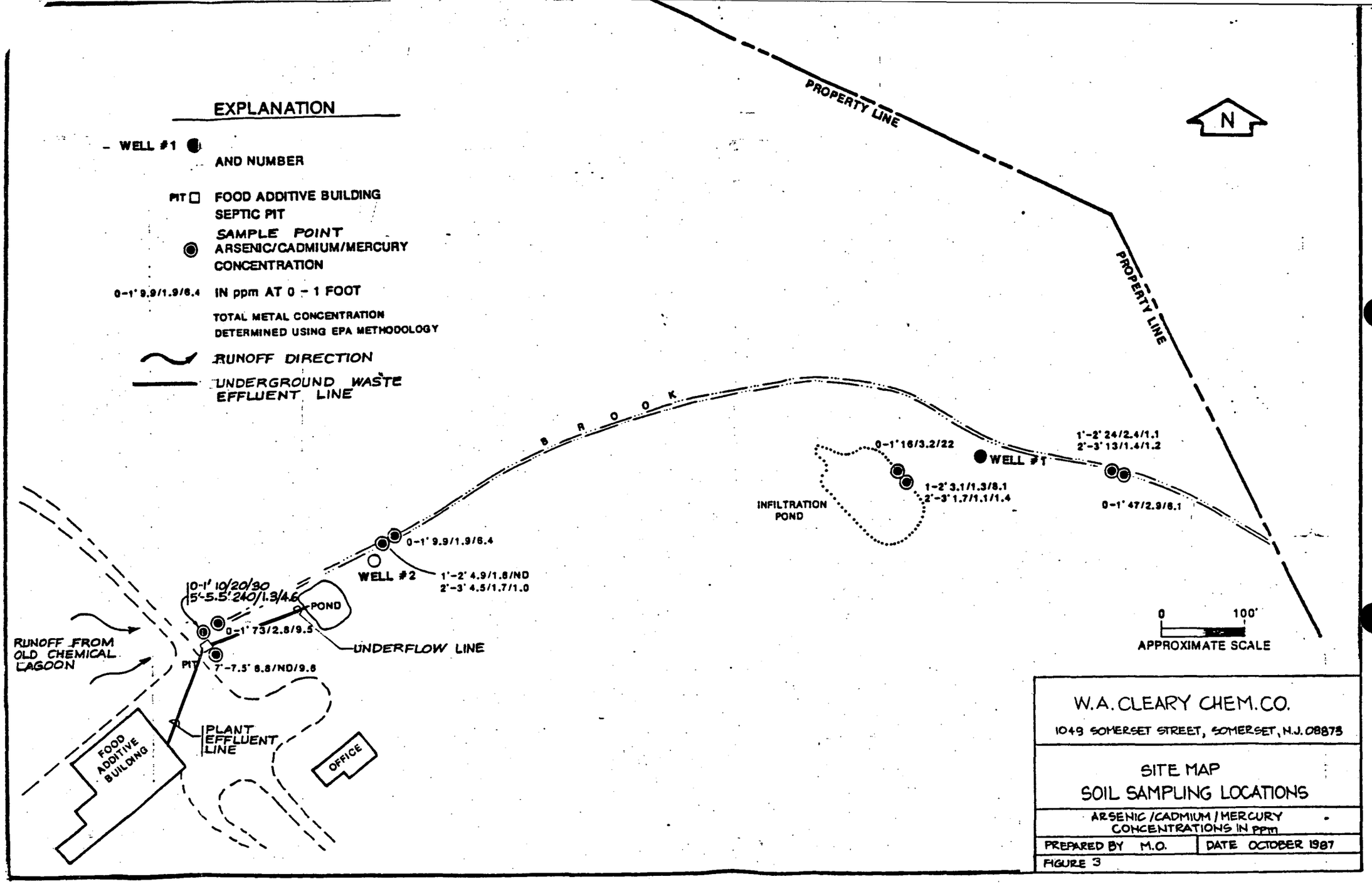
PREPARED BY M.O. | DATE OCTOBER 1987

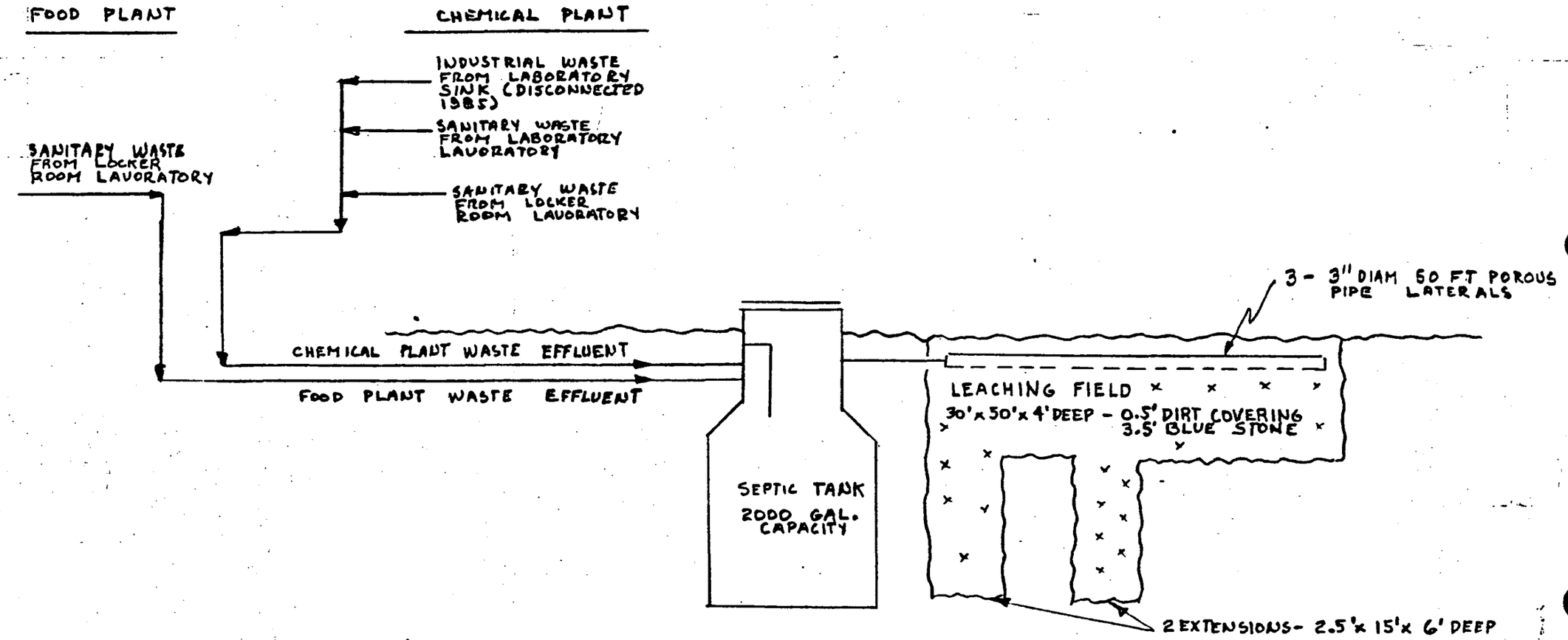
FIGURE 1

ATTACHMENT C



W.A. CLEARY CHEM. CO.	
1049 SOMERSET STREET, SOMERSET, N.J. 08873	
SITE MAP SOIL SAMPLING LOCATIONS	
ARSENIC / CADMIUM / MERCURY CONCENTRATIONS IN ppm	
PREPARED BY M.O.	DATE OCTOBER 1987
FIGURE 2	


EXPLANATION
- WELL #1 AND NUMBER
PIT FOOD ADDITIVE BUILDING SEPTIC PIT
SAMPLE POINT ARSENIC/CADMIUM/MERCURY CONCENTRATION
0-1' 9.9/1.9/6.4 IN ppm AT 0 - 1 FOOT
TOTAL METAL CONCENTRATION DETERMINED USING EPA METHODOLOGY
RUNOFF DIRECTION
UNDERGROUND WASTE EFFLUENT LINE
PROPERTY LINE
PROPERTY LINE
N
BROOK
0-1' 16/3.2/22
WELL #1
1'-2' 24/2.4/1.1
2'-3' 13/1.4/1.2
1-2' 3.1/1.3/8.1
2'-3' 1.7/1.1/1.4
INFILTRATION POND
0-1' 47/2.9/6.1
0-1' 9.9/1.9/6.4
WELL #2
1'-2' 4.9/1.8/ND
2'-3' 4.5/1.7/1.0
0-1' 10/20/90
5'-5.5' 240/1.3/4.6
POND
0-1' 73/2.8/9.5
UNDERFLOW LINE
RUNOFF FROM OLD CHEMICAL LAGOON
PIT
7'-7.5' 6.8/ND/9.8
PLANT EFFLUENT LINE
FOOD ADDITIVE BUILDING
OFFICE
0
100'
APPROXIMATE SCALE
W.A. CLEARY CHEM. CO.
1049 SOMERSET STREET, SOMERSET, N.J. 08873
SITE MAP
SOIL SAMPLING LOCATIONS
ARSENIC / CADMIUM / MERCURY CONCENTRATIONS IN ppm
PREPARED BY M.O.
DATE OCTOBER 1987
FIGURE 3



W.A. CLEARY CHEM. CO.	
1049 SOMERSET STREET, SOMERSET, N.J. 08873	
PROCESS FLOWSHEET	
SEPTIC TANK SYSTEM	
PREPARED BY M.O.	DATE OCTOBER 1987
FIGURE 4	

ATTACHMENT 2

Dan Raviv Associates, Inc.
Consultants in hydrogeology, water quality, landfill hydrology and ECRA compliance

December 15, 1987

State of New Jersey
Department of Environmental Protection
Division of Water Resources
Bureau of Ground Water Quality and Management
401 East State Street - 4th Floor
Trenton, New Jersey 08625

Attention: Mr. George E. Campbell, Geologist

Re: Transmittal of Supplemental Sampling
and Proposed Soil Cleanup Reports
W.A. Cleary Chemical Corporation
Town of Somerset - Somerset County
DRAI Job No. 86C366

Dear Sir:

As requested by Steven J. Picco, Esq. of Greenstone and Sokol of Trenton, New Jersey, Dan Raviv Associates, Inc. (DRAI) has prepared two reports: (1) "Proposed Supplemental Sampling Plan" (for soils and ground water), and (2) "Proposed Soil Cleanup Plan". These proposed sampling and cleanup plans are based on soil quality and ground water flow direction and quality investigation results, as delineated in our April 1987 report. The enclosed sampling and cleanup reports should be reviewed together since they are complimentary to one another.

If you have any questions or need additional information, please call.

Very truly yours,

DAN RAVIV ASSOCIATES, INC.

Dan D. Raviv

Dan D. Raviv, Ph.D.
President

DDR/sm
Enc.
(1 copy sent)
cc: Louis G. Riccardi, Ph.D.
(W.A. Cleary Corp.)

57 East Willow Street, Millburn, New Jersey 07041 (201) 564-6006/FAX (201) 564-6442

ATTACHMENT D

PROPOSED SUPPLEMENTAL SAMPLING PLAN
W.A. CLEARY CHEMICAL CORPORATION
SOMERSET, NEW JERSEY

1.0 INTRODUCTION

Extensive field investigations were performed at the W.A. Cleary Chemical Corporation (Cleary) manufacturing facility in Somerset, New Jersey, prior to the submission of the sampling plan. Results of the investigations have been compiled by Dan Raviv Associates, Inc. (DRAI) in a two-volume hydrogeologic report submitted to the NJDEP, Bureau of Ground Work Quality Management during May 1987 (DRAI, April 1987). The data in this report reflects soil sampling, as required by the Consent Order issued by the NJDEP Region IV Enforcement Element, and monitoring well sampling, as required by an NJPDES/DGW permit. The sampling plan being submitted includes these data as well as proposed post excavation cleanup sampling. Excavation and removal of contaminated soil with post excavation sampling as a means of verification prior to backfill with clean material is proposed. Upon completion of contaminated soil removal, a ground water decontamination system will be proposed and implemented.

A proposed sampling plan for each area of environmental concern is presented in Section 3.0 (Table I). Each area is described by Figures 1, 2 and 8 which show buildings, landmarks, monitoring wells, proposed soil excavation and sampling locations. The number of soil samples per sampling location corresponds to the number found next to the boring location on Figures 1, 2 and 8. All soil samples will be analyzed for As, Cd, Hg, pesticides, herbicides and volatile organic compounds (VOC). The supplemental soil samples will be obtained using boring rig and split spoon methodology (Section 6.2). Post-excavation samples are discrete grab samples. At selected locations, approximately 20 cubic yards of soil will be excavated with a backhoe, sampled and tested for EP-toxicity characteristics (Figures 1 and 2).

The site specific sample management program and the quality control protocols which will be followed during sampling have been included as Section 6.0.

Dan Raviv Associates, Inc. is proposing a site specific Health and Safety Plan which is presented in Section 7.0. The Health and Safety Plan contains information on emergency procedures and chains of commands, as well as training and medical surveillance of field personnel. There are also descriptions of (1) personal protective equipment which will be used during sampling operations; (2) the criteria which will determine what level of protection is necessary; and (3) the decontamination procedures to be followed by all on-site personnel. All DRAI personnel have completed a training program in on-site health and safety practices, the outline of which is included in the Health and Safety Plan. Specific chemicals which have been found in the soils and ground water of the Cleary facility have been identified. A list of the chemical compounds is attached to Section 7.0. Calibration procedures for the HNU and the LEL monitoring instruments are also presented in Section 7.0.

2.0 AREAS OF ENVIRONMENTAL CONCERN

Three areas of environmental concern have been identified at the Cleary facility. The location of the three areas are indicated on Figures 1 and 2 and the reasons for their selection are presented in Table I.

off site sampling ?

ATTACHMENT D

3.0 PROPOSED SUPPLEMENTAL SAMPLING PLAN

3.1 Area #1 Cleary Manufacturing Facility

Area #1 includes the land in the vicinity of the Cleary manufacturing facility (Figure 1). The soils around the Cleary facility are contaminated with arsenic, cadmium and mercury. Mercury is the most likely to exceed its ECRA limit of 1 ppm with increasing depth, but arsenic and cadmium concentrations are also high. Volatile organic chemicals have been found in soil borings at the manufacturing facility only near the still but are a major source of ground water contamination. Only arsenic has been detected in filtered monitoring well samples, presumably due to the general good solubility of arsenic compounds. Neither pesticides nor herbicides have been detected in soil borings around the Cleary facility but as much as 5,500 parts per billion (ppb) of the herbicide 2,4-D have been detected in the monitoring wells along with lesser quantities of some pesticides.
pesticides in gw but not in ~~monitoring wells~~ soil

Extensive field investigations have confirmed that the sources of pollution at the Cleary facility are multiple. The former "old chemical lagoon" is known to have received waste products from the agricultural chemical plant over a period of years. This lagoon was lined with natural silty clay from the immediate vicinity but was never tested for permeability. The lagoon, as originally constructed, was subject to frequent overtopping which led to overland flow of contaminated water in directions west and southwest from the lagoon. A smaller, possible area of spills existed near the east side of the still (Figure 1). The possibly frequent, overland flow formed a horsehoe-shape extending away from the still. The former manufacture of phenylmercuric acetate in the sill is believed to account for the high mercury concentrations found in this area. The storage of drums on the ground near the chemical plant may also have contributed to soil and ground water pollution.

Existing soil sample analyses were presented in the DRAI's April 1987 report. Proposed soil samples and post excavation soil sample locations are shown on Figure 1. In addition, a selected number of backhoe trenches (Figure 1) are proposed in order to simulate excavated material for the purpose of EP-toxicity tests and waste classification in advance of the actual cleanup.

One of the results of soil sample analysis is that mercury appears to be the limiting metal concentration with respect to ECRA limits (i.e., when mercury concentrations are below action level, so are the arsenic cadmium). Phenylmercuric acetate is probably the main source of mercury in soils at the Cleary facility.

3.2 Area #2 - Discharge Pit, Ditch and Lagoons

Area #2 encompasses the food additive buildings, underground cinder block discharge pit and two lagoons (Figure 2). Washdown wastewater discharged from the food additive building to the discharge pit enters a bentonite lined lagoon and then an unlined lagoon by underground piping and an open ditch. Both lagoons are located on the Tara Greens Golf Course, which is

part of the Cleary property (Figure 2). The wastewater discharge to Six Mile Run Creek and the Raritan River is regulated by an NJPDES permit.

Soil borings in the ditch to a depth of about three feet show mercury concentrations slightly above the ECRA limit of 1.0 ppm and volatile organic chemicals (VOC's) at less than 1 ppm. Mercury concentrations around the discharge pit are as high as 9.6 ppm at 7 feet, although no VOC's were detected.

Results of soil samples were reported in DRAI's April 1987 report. Proposed additional delineation and post-excavation soil samples are shown on Figure 2. Test trenches for the purpose of waste classification are proposed at one of the lagoons and along the discharge ditch (Figure 2).

As with Area #1, mercury appears to be the limiting metal with respect to ECRA limits. Much of mercury present in the ditch and unlined lagoon may be due to runoff from the application of fungicides on the golf course.

In addition to supplemental soil sampling, we are proposing a limited number of soil sampling on the Golf Course for delinieation and verification (Figure 8). These samples are intended to verify the absence of mercury at levels above 1 ppm at depths between 2 feet and 4 feet below ground surface.

3.3 Area #3 - Ground Water Monitoring Wells

Five additional ground water monitoring wells are proposed for complete delineation of the ground water contamination (Figure 1). One pair of shallow and deep wells is proposed northwest of the former chemical lagoon (11S and 11D) and a second pair of shallow and deep wells is proposed to the southeast of the former chemical lagoon (12S and 12D). One shallow well is proposed to the east of the "well water pond" (13S) to determine background conditions as well as the ground water mound elevation next to the pond.

The monitoring wells will be drilled and sampled in accordance with DRAI protocols (Section 6.2 of this report). Following well completion, wells will be surveyed, developed, sampled and tested for hydrologic characteristics. Due to the low permeabililty of the upper portion of the Brunswick Shale, slug and recovery tests will be utilized to determine aquifer characteristics. As observed during the well development prior to sampling, most of the shallow wells can only sustain a pumping rate of less than 1 gallon per minute.

Table I

Areas of Environmental Concern
Reasons for Selection

Areas of Environmental Concern	Rationale for Selection	Proposed Sampling
Area #1 (Figure 1)	Vicinity of Cleary manufacturing facility. Manufacture and storage of pesticides, herbicides, and food additives for 45 years.	Supplemental and post-excavation sampling.
Area #2 (Figure 2)	Holding tank (discharge pit) serving the food additive building discharges into ditch and two lagoons. Ditch also receives overland flow from golf course.	Supplemental and post-excavation sampling.
Area #3	Ground water at the Cleary site is polluted with volatile organics, metals and herbicides and pesticides. The Brunswick Shale aquifer is divided into three layers: shallow, intermediate and deep. The first two layers are polluted. Due to an existing shallow mound and "Radial" flow, the ground water plume is not defined in the northwesterly direction.	Additional shallow and deep monitoring wells, and ground water sampling for priority pollutant+40, VOC's and metals

Dan Raviv Associates, Inc.
Consultants in hydrogeology, water quality, landfill hydrology and ECRA compliance

PROPOSED SOIL CLEANUP PLAN FOR W.A. CLEARY CHEMICAL COMPANY SOMERSET, NEW JERSEY DRAI JOB NO. 86C366

Prepared for:

Greenstone and Sokol
Counsellors at Law
226 West State Street
Trenton, New Jersey 08625

Attention: Steven J. Picco, Esq.

Prepared by:

Dan Raviv Associates, Inc.
57 E. Willow Street
Millburn, New Jersey 07041

December 1987

ATTACHMENT D-

PROPOSED SOIL CLEANUP PLAN FOR
W.A. CLEARY CHEMICAL CO.
SOMERSET, NEW JERSEY

1.0 INTRODUCTION

The following cleanup plan is based upon the results of soil sampling and analysis conducted at W.A. Cleary Corporation (Cleary), Franklin Township, Somerset County, New Jersey. Results of the field investigations and sampling were submitted to the New Jersey Department of Environmental Protection (NJDEP) by Dan Raviv Associates, Inc. (DRAI) in a report entitled "Hydrogeologic and Soils Investigation, W.A. Cleary Corporation", Volumes I and II, April 1987.

This cleanup plan deals only with soils cleanup and is based on the delineation of soil contamination conducted during eight sampling periods. Additional delineation was recommended by DRAI in April 1987. The proposed supplemental sampling is presented in the attached "Supplemental Proposed Sampling Plan".

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2.0 PROPOSED SOIL CLEANUP

For the purpose of this cleanup plan, ECRA action levels were used to determine which areas of the 136-acre site require remediation due to the presence of arsenic, cadmium and/or mercury in soils. These metals have action levels for soil of 20 ppm, 3 ppm and 1 ppm, respectively.

2.1 Delineation of Cleanup Areas

Based on soil sampling results (DRAI, April 1986), the following cleanup areas and average depths have been delineated (Figures 1 and 2):

Area 1 - Chemical Lagoon - The previously-excavated site of the former chemical lagoon measures approximately 120' x 220' with an average depth of 6 feet. Sampling results indicate the presence of arsenic (As), cadmium (Cd) and mercury (Hg) above action levels at depths eight feet below surface at bedrock (Samples 69 and 93). The 90' x 90' excavated lagoon portion of the area is about 4 feet above bedrock.

Area 2 - Bordering Area 1 on the southwest, this previously-excavated area measures approximately 100' x 100' with an average depth of 3 feet. Sample results indicate contamination above action levels to a depth of 3 to 4 feet below the excavation bottom (Sample 94).

Area 3 - This hook-shaped area adjoins the western borders of Areas 1 and 2. A 50-foot width is assumed for the length of the area, which extends from monitoring wells MW4 to MW7, a distance of approximately 600 feet. Sampling results indicate contaminants in excess of action levels to a depth of 2 feet (Samples 102 and 103) and with an average depth of about 1 foot.

Area 4 - Septic Field - On the northeast border of Area 1 and encompassing monitoring wells MW3S and 3D, this area measures approximately 100' x 120' with an average depth of 2-5 feet. Sampling results indicate contaminants above action levels to a depth of at least 2 feet to the north (Sample 109) and probably to about 3 feet to the south (Samples 72 and 110).

Area 5 - This area borders Areas 3, 6 and 8, and extends from monitoring well MW4 about 450 feet to the southwest boundary of the property, then about 500 feet south to the path. The 450-foot strip averages about 50 feet in width; the remaining area is about 150' x 300' with an average depth of 1 foot. Contaminants (mainly Hg) are present above action levels to a depth of 1 foot (Samples 104, 105 and 106).

Area 6 - Located south and southeast of the still, this previously-excavated, crescent-shaped area has a linear extension of about 450 feet and an average width of about 50 feet. Sampling results indicate contaminants above action levels down to bedrock (Samples 68, 70, 91 and 92) a depth of 8 feet.

ATTACHMENT D

Area 7 - This previously-excavated area continues the eastern side of the Area 6 crescent. It measures approximately 150' x 45' and an average depth of 3 feet. Sample results indicate contaminants in excess of action levels to a depth of 3 feet below the excavation bottom (Sample 66).

Area 8 - Bordering Areas 5, 6 and 9, this area measures approximately 120' x 250' with an average depth of 1 foot. It contains Hg in excess of the action level to a depth of about 2 feet (Sample 97).

Area 9 - Bordering Areas 6, 7 and 8, this two-pronged area measures about 150' x 350'. Sampling results indicate mercury above the action level in the 0' - 1' interval (Samples 98 and 101).

Area 10 - Food Plant Discharge Pit - Measuring about 30' x 30' with an average depth of 8 feet, this area contains contaminants above action levels to bedrock (Samples 88, 111 and 119).

Area 11 - Brook (golf course drain) - The brook extends from the pond to the eastern property line. Sample results indicate that brook sediments contain contaminants above action levels to depths of up to 3 feet with an average depth of about 1.5 feet. These contaminants appear to extend the length of the brook about 1,300 feet, on the site (Samples 78, 82, 114 and 115).

Area 12 - Infiltration Pond - The pond measures approximately 115' x 75'. Sample results indicate Hg present in sediments at levels exceeding action levels at depths to 3 feet (Samples 75 and 116). Bottom sediments will be sampled as part of the supplemental sampling, prior to cleanup implementation.

Golf Course - Results of sampling of the driveways indicated Hg in concentrations exceeding action levels at the 0' - 1' interval (Samples 74, 77, 80, 86, 117A and 117B, Figure 8 of the April 1987 report). This appears to be the result of the use of lawn maintenance chemicals on the golf course. No remediation is planned for this area. However, additional vertical delineation is proposed for the Golf Course to verify the absence of mercury below the 2 feet sampling interval.

Based on available data, it is estimated that, to meet ECRA action levels for Hg, As and Cd, about 22,000 cubic yards of contaminated soil will be excavated, classified and disposed off-site. Of the 22,000 cubic yards about 2,000 cubic yards are deemed hazardous. However, if action levels for Hg and Cd can be raised to 3 ppm and 5 ppm, respectively, the estimated volume of excavated soil could be reduced to about 15,000 to 17,000 cubic yards.

ATTACHMENT D

2.2 Excavation and Post-Excavation Sampling

For Areas 1, 2, 6 and 7, depths of sampling are measured from the surface and not from the bottom of the previous excavation, which is approximately 1 foot below the surrounding ground level. The following remedial and sampling activities are proposed (Figures 1, 2 and Table II):

Area 1 - Chemical Lagoon - This 120' x 220' area requires additional excavation to bedrock (6 feet). Twelve, post-excavation, sidewall samples will be taken. No bottom samples can be taken, as the excavation will be at bedrock. There will be a total of ten peripheral samples collected at 6 feet.

Area 2 - Following an additional 3 feet of soil removal from the previously-excavated 100' x 100' area, seven post-excavation samples will be taken. One bottom sample will also be taken.

Area 3 - This 50' x 600' area will be excavated to an average depth of 1 foot. Two bottom samples will be taken. There will be a total of twelve samples collected.

Area 4 - Septic Field - This 100' x 120' area will be excavated 2.5 feet, as indicated on Figure 1. Nine post-excavation samples will be taken. Two samples will be taken at the bottom of the excavation.

Area 5 - This area will be excavated to an average depth of 1.0 feet. Twenty-one post-excavation samples will be taken. Four bottom samples will also be collected.

Area 6 - This 50' x 450' area will be further excavated to bedrock (8 feet). Sidewall samples will be taken at 6 and 8 feet where the area borders Areas 5 and 9. No bottom samples will be taken as the area will be excavated to bedrock.

Area 7 - This 150' x 45' area will be excavated an additional 3.0 feet. Five peripheral samples will be taken from sidewalls. Two samples will be taken from the bottom of the excavation.

Area 8 - This 120' x 250' area will be excavated 1 foot. Peripheral samples will be taken at 1 foot. Two bottom samples will also be collected.

Area 9 - This 100' x 300' area will be excavated to a depth of 1.0 foot. Seventeen peripheral samples will be taken from the sidewall at 1-1.5-foot depths. Two bottom samples will also be taken.

Area 10 - Food Plant Discharge Pit - This 30' x 30' area will be excavated to bedrock (8 feet). Eight sidewall samples will be collected at 7 feet.

ATTACHMENT D

Area 11 - Brook - Additional samples will be taken for purposes of delineation, as indicated on Figure 1. Samples will be taken in the center of the stream at 0'-1', 1'-2', 2'-3' and 3'-4' intervals; one sample will be taken from the center portion of each bank at 0'-1' and at 1'-2'. All samples will be analyzed for As, Cd and Hg. Based on these and previous results, the area of contamination will be defined and the stream will be dredged. It is anticipated that at least 1 foot of sediment will be removed from the 3-foot-wide bed, along its 1300 foot length. Post-excavation bottom samples will be taken at six locations in the streambed.

Area 12 - Infiltration Pond - This 115' x 75' pond will be dredged to a depth of 2.0 feet. Twelve post-excavation samples will be taken, two from the bottom and 10 from the sides of the pond.

All samples will be collected according to NJDEP protccols and proper Chain of Custody will be maintained. Laboratory analyses will be performed according to approved EPA methods.

2.3 Site Restoration

Once post-excavation sampling results indicate that an area has been successfully remediated, it will be backfilled with clean soil.

2.4 Stockpiled Soils

Cleary will attempt to classify the soils for disposal prior to excavation (see proposed sampling plan). However, if not approved by the NJDEP excavated soils will be stockpiled on site. All stockpiled soils will be placed on and covered with plastic. The stockpiles will then be sampled and analyzed for waste classification purposes.

Due to the lack of a general soil contamination pattern at the site and the presence of "hot spots" scattered both vertically and horizontally around the site, it was decided to segregate the stockpiles from Areas 1, 2 and 6. Soils from these areas exhibit the greatest chance of containing high levels of contaminants and being classified as hazardous, based on past site activities and the results of sampling analysis. However, it is probable that the majority of the soils will be classified ID 27, based on the preliminary EP-Toxicity results obtained. These results are attached as Appendix A.

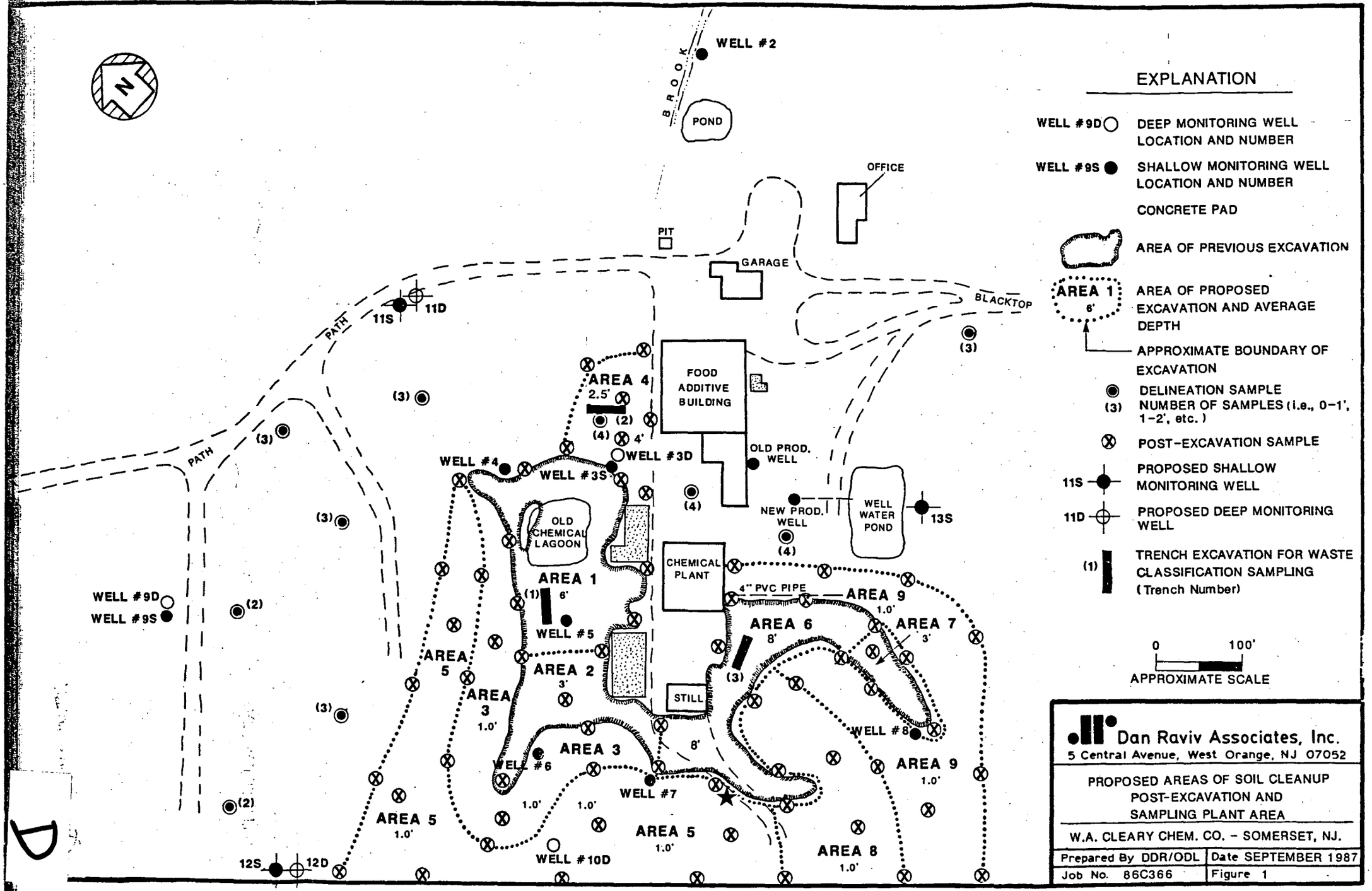
Based on the results of four composite samples (#91, 93, 95 and 97) submitted to Analytikem on March 10, 1987, and analyzed for EP extractables (As, Cd, and Hg) on June 8, 1987, soils from Area 6 are of primary concern. This is due to the high levels of Hg found at various depths near the still (Sample #91, Comp 1). The other Area 6 sample (#95, Comp 3) contained lower Hg levels and extraction results were within guidelines. Area 1 results (sample #93, Comp 3) were also within guidelines, as were Area 8 results (sample #97, Comp 4). (The Area 1 composite comprised samples from 4 to 8 feet, most of which had fairly low levels of As, Cd and Hg.)

Following classification, the stockpiled soils will be disposed of at an approved landfill.

2.5 Soil Transport

Soil classified "hazardous" will be loaded onto end dumps fitted with a woven polyliner of sufficient volume to contain all soil loaded onto the truck. The liner will be taped shut to enclose the soil, which will then be covered with a tarp. The loads will be placarded in compliance with DOT regulations and manifested in compliance with RCRA regulations.

ATTACHMENT D


N
WELL #2
BROOK
POND
OFFICE
PIT
GARAGE
BLACKTOP
PATH
PATH
11S
11D
FOOD ADDITIVE BUILDING
AREA 4
2.5'
4'
WELL #4
WELL #3S
WELL #3D
OLD PROD. WELL
NEW PROD. WELL
WELL WATER POND
13S
OLD CHEMICAL LAGOON
CHEMICAL PLANT
AREA 1
6'
WELL #5
4" PVC PIPE
AREA 9
1.0'
AREA 6
8'
AREA 7
3'
AREA 2
3'
AREA 5
AREA 3
1.0'
STILL
WELL #9D
WELL #9S
WELL #8
AREA 3
WELL #6
WELL #7
AREA 9
1.0'
1.0'
1.0'
AREA 5
1.0'
AREA 5
1.0'
WELL #10D
AREA 8
1.0'
12S
12D
8'
(1)
(2)
(3)
(4)
EXPLANATION
WELL #9D DEEP MONITORING WELL LOCATION AND NUMBER
WELL #9S SHALLOW MONITORING WELL LOCATION AND NUMBER
CONCRETE PAD
AREA OF PREVIOUS EXCAVATION
AREA 1 6' AREA OF PROPOSED EXCAVATION AND AVERAGE DEPTH
APPROXIMATE BOUNDARY OF EXCAVATION
(3) DELINEATION SAMPLE NUMBER OF SAMPLES (i.e., 0-1', 1-2', etc.)
POST-EXCAVATION SAMPLE
11S PROPOSED SHALLOW MONITORING WELL
11D PROPOSED DEEP MONITORING WELL
(1) TRENCH EXCAVATION FOR WASTE CLASSIFICATION SAMPLING (Trench Number)
0 100'
APPROXIMATE SCALE
Dan Raviv Associates, Inc.
5 Central Avenue, West Orange, NJ 07052
PROPOSED AREAS OF SOIL CLEANUP POST-EXCAVATION AND SAMPLING PLANT AREA
W.A. CLEARY CHEM. CO. - SOMERSET, NJ.
Prepared By DDR/ODL
Date SEPTEMBER 1987
Job No. 86C366
Figure 1

ATTACHMENT D

Table I

Areas of Proposed Excavation
and Estimated Volumes for Disposal

Area # (1)	Average Depth (Feet)	Circumference (Linear Feet)	Area (Square Feet)	Volume (2) (Cubic Yards)
1	6	750	24,000	5,500 (3) (hazardous 1,500 ID #27 4,500)
2	3	600	10,000	1,100
3	1.0	1,200	30,000	1,110
4	2.5	440	12,000	1,110
5	(.5-1)1.0	1,700	52,500	1,945
6	8	1,000	22,500	6,700 (3) (hazardous 1,000 ID #27 5,700)
7	3.0	400	4,800	535
8	(.5-1)1.0	700	30,000	1,110
9	(.5-1)1.0	1,550	52,500	1,950
10	8	120	900	270
11	1.5	1,600	3,900	250
12	2.0	375	7,500	550
			TOTAL:	22,130 cu.yd.

(1) See Figures 1 and 2 for area boundaries.
(2) Computed volume of cleanup to reach ECRA action levels (i.e., Hg = 1 ppm, As = 20 ppm and Cd = 3 ppm).
(3) Estimated volume of previous lagoon excavation (1,200 cu.yds) has been subtracted from area to be excavated.

Dan Raviv Associates, Inc.
Job No. 86C366

ATTACHMENT D

Table II

Proposed Post-Excavation Sampling Locations, Depths and Parameters

Area # (1)	Peripheral # of Samples	Peripheral Depth	Bottom # of Samples	Bottom Depth	Total of Samples	Parameters
1	12	10 @6' 2 @4'	-		12	12 As,Cd,Hg 2 VOC's 2 Pest. & Herbicides
2	6	6 @3'	1	5'	7	7 As,Cd,Hg 1 VOC 1 Pest. & Herbicides
3	12	12 @1'	2	1-1.5'	14	14 As,Cd,Hg
4	7	7 @2'	2	1 @2' 1 @4'	9	9 As,Cd,Hg 1 VOC 1 Pest. & Herbicides
5	17	17 @1'	4	1-1.5'	21	21 As,Cd,Hg
6	12	6 @8' 6 @6'	-		12	12 As,Cd,Hg 2 VOC's 2 Pest. & Herbicides
7	5	5 @3'	2	1 @3' 1 @4'	7	7 As,Cd,Hg
8	7	7 @1'	2	1'	9	9 As,Cd,Hg
9	17	17 @1'	2	1-1.5'	19	19 As,Cd,Hg
10	8	4 @8' 4 @6'	-		8	8 As,Cd,Hg 1 PP+40
11	8 @1'		6	1-2'	14	8 As,Cd,Hg 1 VOC 1 Pest. & Herbicides
12	10	10 @2'-3'	2	6'	12	12 As,Cd,Hg 1 Pest. & Herbicides

In addition, for all areas, approximately 50 samples of EP-Toxicity will be tested for: metals, reactivity, ignitability, corrosivity, Pest. & Herbicides.

(1) See Figures 1 and 2 for post-excavation sample locations.

Dan Raviv Associates, Inc.
Job No. 86C366

ATTACHMENT D

W.A. CLEARY CHEMICAL CORPORATION

P.O. Box 10, 1049 Somerset Street
Somerset, N.J. 08873 (201) 247-8000

January 20, 1987

Steven J. Anderson
Geologist
Department of Environmental Protection
Division of Water Resources
P.O. Box CN 029
Trenton, N.J. 08625

Re: W. A. Cleary Corporation
NJPDES Permit No. NJ0003816
Discharge to Groundwater Permit
Status Memorandum

Dear Mr. Anderson:

This letter will inform you of the status of the NJPDES/DGW requirements at our site.

During this week monitoring wells were sampled in compliance with the Discharge to Groundwater Permit and the samples were submitted for analysis. It is anticipated that the Discharge Monitoring Reports will be submitted during February.

Our land surveyor has been revising our site plan to locate the boundaries of the 1 foot excavation area. He anticipates submitting the revised plan this week for our review.

The Discharge to Groundwater Meeting on November 24, 1986 required us to furnish you certain information (see letter Marvin Oresky, P.E. to Steven Anderson dated December 1, 1986). The status of the required information transmittals are as follows:

1. Analytical Results on Excavated Soil - The revised site plan will be further modified to show the location of soil sampling points. This resulting drawing will then be submitted with analytic results obtained on the indicated sampling points. It is anticipated that this information will be submitted to you during the week of February 2, 1987.

ATTACHMENT E

Steven J. Anderson
Geologist
Dept. of Environmental Protection
Division of Water Resources

2. Disposal Facility Names, Shipment Volumes, and Manifests

a. Lagoon Wastewater

a1. Treatment Facility - Dupont Chamber Works
Route 130
Deepwater, N.J. 08023

a2. Manifest Shipment Volume - 123,200 gallons

b. Solids

b1. Treatment Facility - Waste Conversion
2869 Sandstone Drive
Hatfield, PA. 19440

b2. Shipment Volume	Manifest	Actual Weight
a. Sludge	800 cubic yards	803.8 tons
b. Clay Lining	792 cubic yards	963.2 tons
c. Site Excavation	2130 cubic yards	3037.93 tons

3. Sampling Analysis Program - Dan Raviv Associates, Inc. is presently preparing the sampling analysis program and a hydrogeological report. They will include and be based upon the results of latest sampling. The reports should be ready for presentation is approximately 8 weeks.

Please contact me immediately if you should have any comments or questions on this transmittal.

Very truly yours,

Marvin Oresky

Marvin Oresky, P.E.

MO:sm
Manifests enclosed
Certified Mail P 570 480 419

ATTACHMENT E

Industrial Site Evaluation Element
Bureau of Environmental Evaluation and Cleanup Responsibility Assessment
Environmental Cleanup Responsibility Act

Report of Inspection

ECRA Case #87941 Date of Inspection 7/8/88
Inspection Category: Preliminary
Inspector: Elizabeth Mataset

Industrial Establishment: W.A. Cleary Chemical Corp.

Location: 1049 Somerset Street, Franklin Twp., Somerset County

Individuals Involved:
Lois Arbegast - DEP/BEECRA
Vincent DiGregorio - DEP/BEERA
George Campbell - DWR
Dan Raviv - Raviv Assoc.
Karen Weber - Raviv Assoc.
Mark Rosken - OSWM, Somerset County
Vincent Agovino - Franklin Twp., Health Dept.
Robert Cuddy - Franklin Twp. Fire Prevention
L.G. Ricciardi - W.A. Cleary Chemical
James E. Esposito - Consultant/W.A. Cleary Chemical

NARRATIVE DESCRIPTION

Arrived on site at 9:00 a.m. The weather was humid with hazy sunshine, temperatures were in the 90's. Historically, the company has manufactured agricultural chemicals. Sampling done under the guidance of NJDEP/DWR shows high levels of Mercury, Arsenic and Cadmium in the soil and volatile organics in the ground water plus some metals. The main source of this contamination appears to be a lagoon to which virtually all the company's hazardous wastes were discharged until 1984. A 1984 National Dioxin Study Results indicate that dioxin is present on the site.

A pre-inspection meeting was held in which Dan Raviv briefly outlined work done on the site to date. I conducted the inspection, held a debriefing and left the site at 1:30 p.m.

DEFICIENCIES NOTED

1. What appeared to be friable asbestos insulation on piping was observed in the Food Additive Building, the Chemical Plant, and the piping under the pad of the Still. Also, what appears to be asbestos paneling is on the side of the Still.

2. A whitish rubbery substance was observed leaking from drums stored on the Still concrete pad. This substance was draining onto the bare ground at the rear of the pad.

3. Two transformers are present on site, the history of these transformers and others which may have been replaced is not known. It is not known if the present or former transformers contain PCBs.

ATTACHMENT F

4. A concrete block structure of unknown use exists in the rear of the Food Additive Building. Also a silver vessel of unknown purpose is in this area. There is staining and distressed vegetation (burnt) near discharge points of pipes in this area.

5. The Pit to which the Food Additive Building discharges has not been sampled to date.

6. The Pond to which the Pit discharges has not been sampled. It exhibited an oily scum on it's surface.

7. The Initial Notice had no information on the piping associated with the Boiler Room. The inspector was unable to ascertain the function or discharge point of the pipelines and other features in this area at the time of inspection. Features which require further explanation include, all piping, incoming and outgoing, the concrete pit containing a tank, and the pit under the steel plate near the door to the room.

8. Trenches with metal grating serve to hold wastes in the Chemical Plant. Waste from these trenches is hauled away by DuPont, according to company representatives. No documentation on the disposal of this waste has been submitted.

9. Several trailers which are used for chemical storage are present on site.

10. Various chemicals are stored in the Concrete Building for Flammable Solvent Storage.

11. No off-site delineation of contamination has been proposed.

12. Oily staining of soil was observed around the trash compactor. The trash compactor was located at the rear of the Chemical Plant.

ACTIONS REQUIRED ON THE PART OF THE APPLICANT

1. W.A. Cleary Chemical Corp. (W.A. Cleary) shall conduct a site wide asbestos investigation. All suspect materials shall be tested. All friable asbestos shall be remediated by either encapsulation or removal by a NJ licensed asbestos contractor.

2. W.A. Cleary shall immediately cease the discharge of the whitish rubbery substance leaking from the Still concrete pad. All spilled material shall be cleaned up and disposed of in a manner acceptable to the NJDEP.

3. W.A. Cleary shall provide historical information on all electrical transformer areas on site. W.A. Cleary shall submit documentation on the PCB content of the present and past transformers. If any transformers on-site contain PCBs or have contained PCBs, W.A. Cleary shall propose sampling as per the Draft ECRA Sampling Plan Guide (DESPG).

ATTACHMENT F

4. W.A. Cleary shall submit information on the use and construction of the concrete block structure, and the silver vessel behind the Food Additive Building. W.A. Cleary shall sample the areas of distressed vegetation for Priority Pollutants +40 (PP+40) and Petroleum Hydrocarbon (PHC); the samples shall be taken at the 0-6" interval and in accordance with the DESPG.

5. W.A. Cleary shall sample the Food Additive Building discharge Pit for Mercury, Arsenic, Cadmium and Priority Pollutants - pesticides fraction. Both liquid and sediments in the Pit shall be sampled.

6. W.A. Cleary shall sample the Pond to which the Food Additive Building Pit discharges to. The water in this Pond shall be sampled as well as the sediments. Sample analysis shall include Cadmium, Arsenic, Mercury, and pesticides.

7. W.A. Cleary shall submit a detailed description and map of all piping and their discharge points. Also, more information is needed on the concrete pit and the pit under the steel plate in the boiler room. If either pit is open to the environment, W.A. Cleary shall sample these areas. Analysis shall include PHCs as per the DESPG.

8. W.A. Cleary shall submit waste disposal manifests for all hazardous wastes associated with the Chemical Plant.

9. W.A. Cleary shall provide specific information on all substances stored in the trailers on-site. A list of contents shall be supplied for each trailer. Material Safety Data Sheets (MSDS) shall be submitted for all non-generic named substances.

10. W.A. Cleary shall provide a list of all substances stored in the Flammable Solvent Storage Building. MSDS sheets for these substances shall also be submitted.

11. W.A. Cleary shall submit a proposed off-site contamination delineation plan. To this end, W.A. Cleary shall immediately begin an investigation of all wells within a one mile radius of the facility.

12. W.A. Cleary shall excavate the stained soil around the trash compactor. The source of ths staining shall be stopped. One soil sample in the area of excavation shall be taken at the 0-6" interval and analyzed for PHC.

13. W.A. Cleary shall submit a response to all the deficiencies noted in this report within thirty (30) days of the receipt of this letter. All sampling and sampling results shall be in accordance with the DESPG. Sampling results shall be accompanied by Tier II QA/QC.

ATTACHMENT F

ACTIONS REQUIRED ON THE PART OF BEECRA

1. Review and comment on the response to this report.

2. Review and comment on the Sampling Plan submitted by W.A. Cleary.

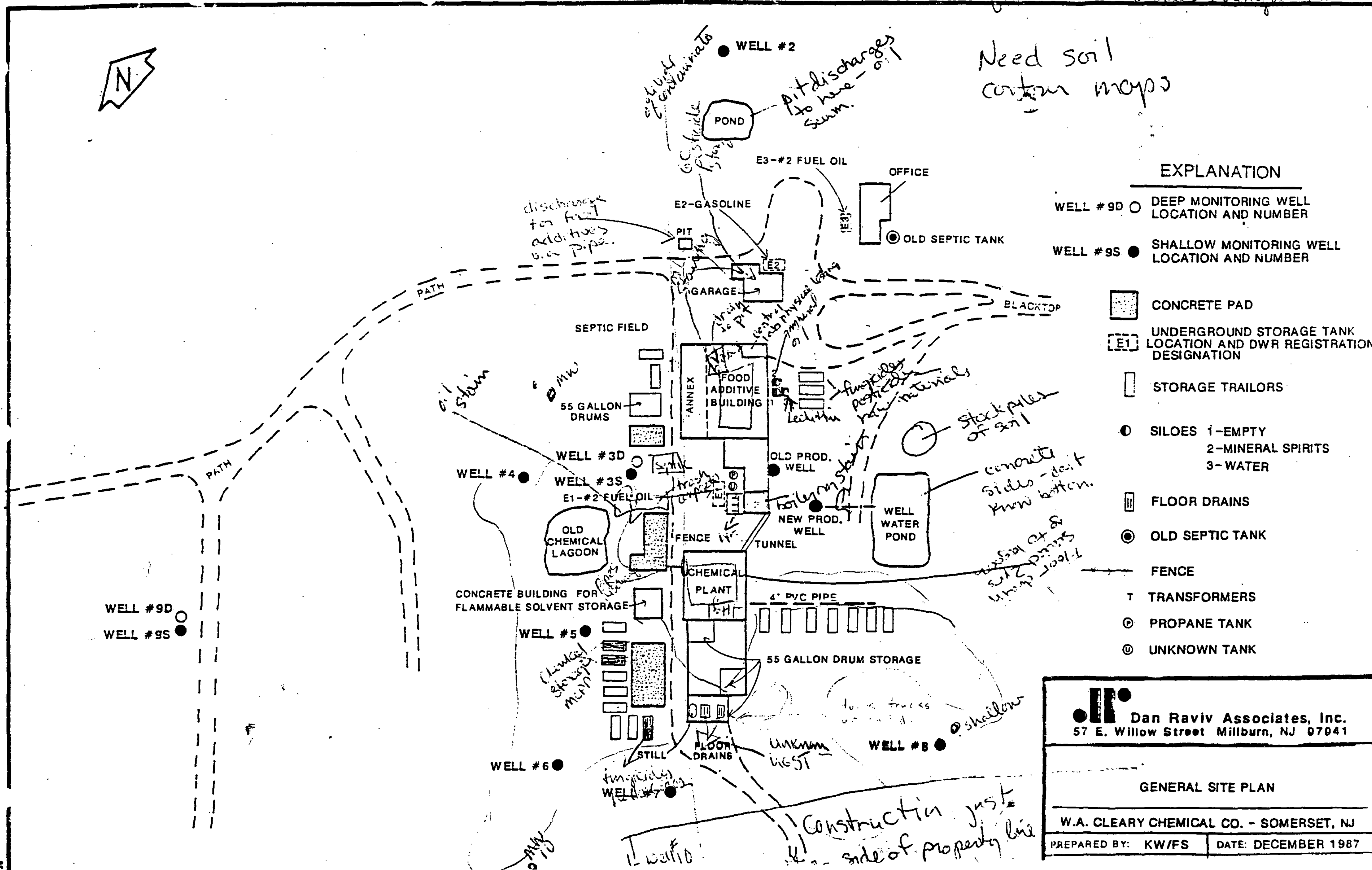
Inspector/Case Manager Signature Christine J. Matasi

Approved: Lois Urbegost, Supervisor
Bureau of Environmental Evaluation
and Cleanup Responsibility Assessment

ATTACHMENT F

radial flow in shallow aquifer - GW divide through site

Agent - Steve Ricco (609) 393-2400



ATTACHMENT F

7/20/88

NATIONAL DIOXIN STUDY
W.A. CLEARY CHEMICAL CORPORATION
SOMERSET, NJ

SAMPLING REPORT & RESULTS

ATTACHMENT G

W.A. Cleary Chemical Corporation, Inc. Sampling Report

TABLE OF CONTENTS

ATTACHMENT G

1.0 Project Name: "National Dioxin Study" - Region II, Tier 6 Investigation of W.A. Cleary Chemical Corp.

2.0 Project Requested by: U.S. EPA, as part of EPA's overall Dioxin Strategy

3.0 Date of Request: October 1983 - February 1984

4.0 Date of Project Initiation: April 1984

5.0 Regional Project Coordinator: Richard Spear (201/340-6685)
Environmental Services Division
U.S. EPA, Region II

6.0 Regional Quality Assurance Officers: Richard Spear (201/340-6685)
Gerald McKenna (201/340-6645)
Environmental Services Division
U.S. EPA, Region II

7.0 Project Description

7.1 Project Objectives

The objective of this investigation is to determine whether environmental samples collected at W.A. Cleary Chemical Corporation are contaminated with 2,3,7,8-TCDD or its related family.

7.2 Site Description

W.A. Cleary Chemical Corporation is located at the following address:

1049 Somerset Street
Somerset, NJ 08873
(201) 247-8000

This address corresponds to longitude 74°29'10" and latitude 40°28'40". The site is approximately 137 acres in size and is essentially 100% accessible to soil sampling. This property is divided into three distinct regions. The first is the formulation buildings and their surrounding lawn, which are located in the south eastern area of the property. The second region is the company golf course which is located along the northern boundary of the property. Finally, the third region is a densely wooded area that is located in the western end of the property.

ATTACHMENT G

For the period from 1977 to 1983, W.A. Cleary Chemical Corporation formulated a total of 382,389 pounds of Mecoprop salts and 149,392 pounds of 2, 4-D salts. During this same period, approximately 10,000 gallons per year of liquid waste was discharged to an on-site lagoon and approximately 6,975 cubic yards of solid waste was contract hauled to the Edgeboro landfill in East Brunswick, NJ.

7.3 Sampling Locations and Analysis

Location	Matrix	No. of Samples	Strategy	Analysis
Facility	Soil	22	directed	ppb (CLP)
Facility	Soil	10	random	ppb (CLP)
Field Blank	Soil	2	QA/QC	ppb (CLP)
Performance	Soil	2	QA/QC	ppb (CLP)
Field Duplicate	Soil	2	QA/QC	ppb (CLP)

7.4 Sampling Design

Directed Samples

- Bearing "V" is 36 inches from the southeast wall of the chemical plant building.
- Reference point "W" is defined as the south corner post of the fence that surrounds the fresh water reservoir.
- Reference point "X" is defined as the south corner of the chemical plant building (see Figure 1).
- Reference point "Y" is defined as the east corner of the chemical plant building (see Figure 1).
- Reference point "Z" is defined as the indented corner of the barrel storage slab (see Figure 1).

Field ID	Time	Distance	Bearing	Reference Point
18	10:58	113'10"	210°	W
17	11:04	28'6"	210°	18
16	11:12	29'10"	262°	17
14	11:28	69'0"	120°	X
15	11:52	65'7"	146°	Y
13	12:15	50'6"	172°	Y
12	12:16	49'6"	100°	X
8	12:27	3'4"	V	X
9	12:36	23'4"	V	X
10	12:44	43'4"	V	X

ATTACHMENT G

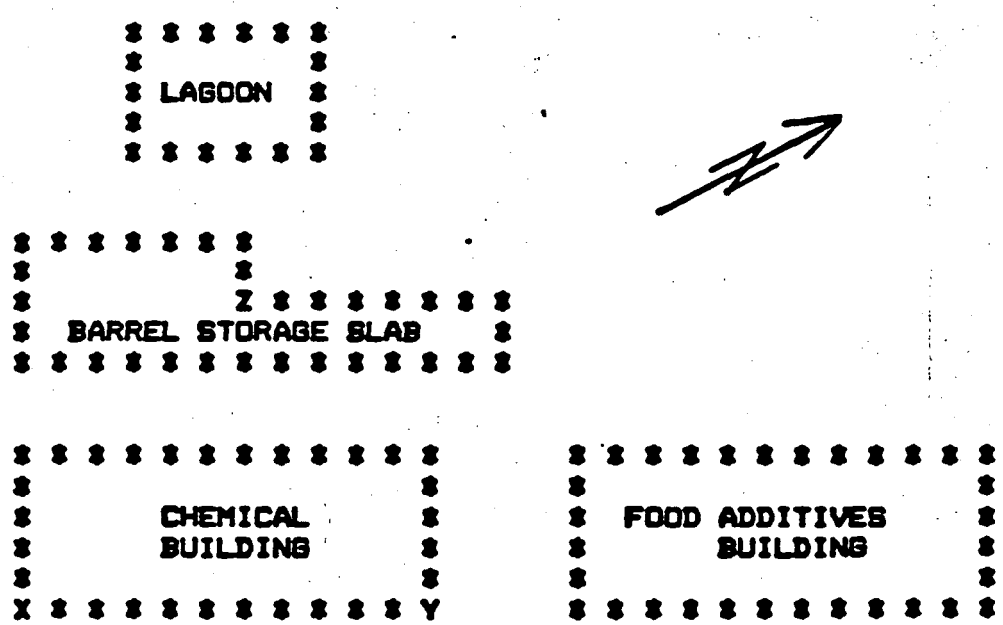


Figure 1. Reference Point Location

ATTACHMENT G

Field ID	Time	Distance	Bearing	Reference Point
11	12:56	63'4"	V	X
7	13:09	16'2"	320°	Z
4	13:13	24'6	320°	Z
6	13:16	25'0"	233°	7
5	13:28	25'0	233°	6
2	13:38	51'6"	322°	6
1	13:40	53'0"	013°	2
3	13:46	47'0"	123°	2

- Sample #19 was a sediment sample taken out of the holding pond. It was taken at 15:50 approximately 12 feet from shore near sample location #4.
- Sample #20 was soil sample taken out of the dry creek bed. It was taken 9'7" from the north wall of the sump located northwest of the office building on a bearing of 025°.
- Sample #21 was a soil sample taken out of the dry creek bed. It was taken 100 feet east of the 4" well located east of the office building on a bearing of 076°.
- Sample #2 and sample "3 were duplicated.

Random Samples

Field ID	Time	Distance along track	Distance to sample	Bearing
22	10:00	25'	315'	37°SW
23	10:45	475'	950'	37°SW
24	11:10	525'	365'	37°SW
25	11:50	625'	615'	37°SW
26	12:10	725'	165'	37°SW
27	13:55	1375'	1065'	37°SW
28	14:30	1875'	365'	37°SW
29	15:05	1875'	765'	37°SW
30	15:50	2625'	515'	37°SW
31	16:15	3225'	165'	37°SW

- Sample #22 was duplicated.

Field ID	Sample Number
1	DB003801
2	DB003802
2 dup.	DB003803
3	DB003804
3 dup.	DB003901
4	DB003805

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Field ID		Sample Number
	5	DB003806
	6	DB003807
	7	DB003808
	8	DB003809
	9	DB003810
	10	DB003811
	11	DB003812
	12	DB003813
	13	DB003814
	14	DB003815
	15	DB003816
	16	DB003902
	17	DB003817
	18	DB003903
	19	DB003904
	20	DB003905
	21	DB003906
	22	DB003907
	23	DB003908
	24	DB003909
	25	DB003910
	26	DB003911
	27	DB003912
	28	DB003913
	29	DB003914
	30	DB003915
	31	DB003916
	32	DB003917
(Field Blank)	B1	DB003818
(Field Blank)	B2	DB003918
(J465V88G)	PE	DB003819
(Y52NX1505)	PE	DB003919

ATTACHMENT G

NATIONAL DIOXIN STUDY
Sampling Results - W.A. Cleary in Somerset, NJ

EPA SAMPLE NUMBER	CONC. TCDD (ppb)	DETECTION LIMIT (ppb)
DB003801	ND	0.10
DB003802	ND	0.04
DB003803	ND	0.09
DB003804	ND	0.05
DB003805	ND	0.02
DB003806	ND	0.06
DB003807	ND	0.06
DB003808	ND	0.06
DB003809	ND	0.09
DB003810	ND	0.02
DB003811 native spike-1 ppb	0.89	-
DB003812	34.7 J	-
DB003813	ND	0.15
DB003814	ND	0.04
DB003815	ND	0.03
DB003816	ND	0.10
DB003817	ND	0.08
DB003818	ND	0.03
DB003819 performance sample	6.40 *	-
DB003901	ND	0.09
DB003902	ND	0.17
DB003903	ND	0.06
DB003904	ND	0.08
DB003905	ND	0.17
DB003906	ND	0.05
DB003907	ND	0.07
DB003908	ND	0.04
DB003909	ND	0.04
DB003910	ND	0.06
DB003911	ND	0.04
DB003912	ND	0.05
DB003913	ND	0.03
DB003914	ND	0.02
DB003915	ND	0.06
DB003916	ND	0.04
DB003917 native spike-1 ppb	0.98	-
DB003918	ND	0.04
DB003919 performance sample	3.10 **	-

* actual value = 7.77 ppb
** actual value = 4.3 ppb
J This value had a high surrogate response factor and could be off quantitatively by about 20%.

ATTACHMENT G

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
TRENTON, NEW JERSEY 08625

IN THE MATTER OF W.A. CLEARY CHEMICAL CORPORATION FRANKLIN TOWNSHIP, NEW JERSEY	:	ADMINISTRATIVE CONSENT ORDER

The following FINDINGS are made and ORDER issued pursuant to the authority vested in the Commissioner of the New Jersey Department of Environmental Protection (hereinafter "NJDEP") and duly delegated to the Division of Water Resources by N.J.S.A. 13:1D-1 et seq., N.J.S.A. 13:1B-5, and the New Jersey Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq.

FINDINGS OF FACT

1. W. A. Cleary Chemical Corporation (hereinafter "W. A. Cleary") is the owner and operator of an industrial facility located at 1049 Somerset Street, Franklin Township, Somerset County, which includes the Tara Green Golf Course. This facility produces food additives and agricultural chemicals, including pesticides, herbicides, fungicides and green coloration for plant sprays.

2. The food additive section of W. A. Cleary discharges wastewaters intermittently into the Raritan River via three settling ponds (consisting of one underground concrete tank, one bentonite lined lagoon and one unlined lagoon), connected in series by underground piping and an open ditch. This surface water discharge is regulated by National Pollutant Discharge Elimination System (NPDES) Permit No. NJ0003816, issued January 30, 1976 by the United States Environmental Protection Agency.

3. The agricultural chemical section discharges any non-recycleable washwaters into a clay lined evaporative lagoon (hereinafter "chemical lagoon"). Samples of the clay lining at the lagoon bottom collected on January 31, 1979 and analyzed by an independent laboratory (Rossnagel No. 3681, March 8, 1979) were reported to contain significant quantities of Arsenic (475 milligrams per kilogram (mg/kg)), Cadmium (1000 mg/kg) and Mercury (200 mg/kg) (sampling results attached). Sampling on September 19, 1980 by NJDEP of the top edge of the lining also revealed the presence of Arsenic (7 parts per million (ppm) and 86 ppm) and Mercury (795 ppm and 636 ppm) (sampling results No. C07451 and C07452 attached). Arsenic, Cadmium and Mercury are listed as hazardous

ATTACHMENT H

substances by this Department pursuant to N.J.A.C. 7:1E-1.3(j). The lagoon itself is undersized and is subject to overflowing. Additionally, the chemical lagoon is not permitted by NJDEP, pursuant to N.J.A.C. 7:14A-1 et seq.

4. NJDEP issued a directive dated June 25, 1981 requiring W. A. Cleary to submit New Jersey Pollutant Discharge Elimination System (NJPDES) permit applications for the three food additive lagoons and for the "chemical" lagoon.

5. On October 27, 1981, NJDEP discovered the presence of an area of contaminated soil at the W. A. Cleary facility in the general area of the chemical lagoon near the tree line, which was being considered for placement of a monitoring well. Four soil samples were collected and analyzed for Arsenic, Mercury and Cadmium. The results of the analyses (attached - No.'s 05011, 05012, 05013 and 05014) revealed the presence of significant quantities of these materials.

6. A "split sampling" of a selected area along the tree line by NJDEP and W. A. Cleary was conducted on December 15, 1981. NJDEP results (No. 05022 attached) of this sampling were: Arsenic 728.8 ppm, Cadmium 1420 ppm, Mercury 16.2 ppm. W. A. Cleary had samples analyzed by two independent laboratories; the analyses reported by Rossnagel labs were: Arsenic 1100 ppm, Cadmium 3100 ppm and Mercury 13500 ppm (Lab report No. 10,375 attached).

7. On March 24, 1982, an NJDEP inspector reported the on-site storage, for more than ninety (90) days, of fifty-five (55) gallon drums of waste from the agricultural products formulating process (pesticide formulary waste). This material is not considered waste by W. A. Cleary and they have requested the Bureau of Hazardous Waste Classifications, Division of Waste Management to render a final decision as to its nature.

8. The discharge of pollutants into the surface or ground waters of the State, or onto land from which they might flow or drain into said waters, excepting in compliance with a valid NJPDES and/or NPDES Permit, is in violation of N.J.S.A. 58:10A-6, and of N.J.A.C. 7:14A-1 et seq., (the New Jersey Pollutant Discharge Elimination System Regulations).

9. Storage of drums of hazardous waste on-site for periods of more than ninety (90) days constitutes a hazardous waste storage and transfer facility. The operation of such a facility without a permit is in violation of N.J.S.A. 13:1E-1 et seq., the Solid Waste Management Act and N.J.A.C. 7:26-1.1 et seq., the regulations promulgated thereunder.

10. On March 9, 1982, W. A. Cleary submitted a completed NJPDES permit application for the three food additive lagoons, and for the proposed construction of the new chemical lagoon, to NJDEP.

ATTACHMENT H

11. On March 11, 1982, at a meeting held between representatives of NJDEP and W. A. Cleary, agreement was reached on the specific measures and time frame necessary for W. A. Cleary to resolve all problems discussed in the preceeding paragraphs and thus achieve compliance with N.J.S.A. 58:10A-1 et seq., and N.J.S.A. 13:1E-1 et seq. These measures are formalized as follows:

ORDER

NOW THEREFORE IT IS ORDERED AND AGREED AS FOLLOWS:

12. The effective date of this Administrative Consent Order shall be October ~~12~~ 25 1982, (the "effective date").

13. GROUND WATER MONITORING WELLS

a) W. A. Cleary shall, within sixty (60) days of official NJDEP notification of the required number and exact location of each well, install said wells, and sample each for Arsenic (As), Cadmium (Cd), Mercury (Hg), pesticides and volatile organic chemicals within two (2) weeks of installation. Notification by NJDEP shall be by means of issuance of an NJPDES permit for the W. A. Cleary facility, or as an alternative, by means of correspondence outlining the specific well locations to be required by the forthcoming permit, prior to its issuance. A regular sampling schedule for the future will be developed by the NJDEP after receipt and analyses of the results of the first sampling.

b) The construction of all monitoring wells and sampling collection and analyses shall conform to the requirements of the NJDEP.

14. COMPLETION AND UTILIZATION OF THE NEW SURFACE IMPOUNDMENT
W. A. Cleary shall, within one hundred fifty (150) days of the issuance of the aforementioned NJPDES permit:

a) Excavate and set aside for removal as hazardous waste, the minimum requisite quantity of soil necessary for lining equipment.

b) Determine by laboratory analyses of representative soil borings gathered to sufficient depth, the need for further soil removal within the new lagoon excavation, in accordance with procedures specified in paragraph 15(b).

c) Install the impervious lining on the "clean" soil base.

d) Complete all ancillary construction.

e) Redirect all process water to the new lagoon.

15. REMOVAL OF CONTAMINATED SOILS, SLUDGE, WASTEWATERS AND WASTE DRUMS
W. A. Cleary shall, within one hundred eighty (180) days of the introduction of process wastewaters into the new surface impoundment, conduct appropriate laboratory analyses and remove all wastewaters and sludges from the old

chemical lagoon, all contaminated soil on-site, and all hazardous wastes on-site to an acceptable waste disposal site, and backfill those excavated areas with clean fill, all such actions to be in accordance with the requirements of NJDEP's Solid Waste Administration, and in the following manner:

a) Wastewaters and Sludges
W. A. Cleary shall analyze, remove and dispose of all wastewaters and sludges from the old chemical lagoon.

b) Contaminated Soil Removal
The NJDEP will determine the minimum amount of contaminated soil to be removed from the site, utilizing the data from W. A. Cleary's representative soil borings and analyses which will be gathered to sufficient depth in the following areas

(1) The old chemical lagoon sides and bottom.

(2) The excavation for the new lagoon, as specified in paragraph 14.

(3) The contaminated dump site along the tree line.

All soil borings shall be analyzed for those parameters listed in paragraph 13(a), and shall be submitted to NJDEP within ten (10) days of receipt of the analytical reports.

c) Hazardous Waste Drums
The contents of the drums containing pesticide formulary waste shall be analyzed and stored and/or disposed of as required by and according to the determinations of the Division of Waste Management.

d) On-Site Treatment of Wastes
Any anticipated treatment of waste on-site must receive the prior approval of the Solid Waste Administration. Proposals shall be submitted to Mr. Frank Coolick, Bureau of Hazardous Waste Engineering, Division of Waste Management. Copies of the proposals shall be submitted to Mr. Mikulka, at the address listed in paragraph 16.

16. SUBMISSION OF INFORMATION REQUIRED BY THIS ORDER
Any submission of information required by this Order, except as otherwise noted, shall be made to:

Mr. Joseph M. Mikulka, Chief
Region IV
Enforcement Element
Division of Water Resources
CN-029
Trenton, New Jersey 08625

17. W. A. Cleary hereby consents and agrees to comply with all the terms and provisions of this Administrative Consent Order, which shall be fully enforceable in the Superior Court of New Jersey upon filing of a summary

ATTACHMENT H

action for compliance pursuant to N.J.S.A. 58:10A-1 et seq., and which also, may be enforced in the same fashion as an Administrative Order issued by this Department pursuant to this same statutory authority. In the event of any changed circumstances, either factual or legal, which would render the provisions of this Administrative Order inappropriate or unnecessary, or in the case of any disagreement between parties over the interpretation or construction of this Administrative Consent Order, each party reserves the right to apply to a court of competent jurisdiction to seek a judicial ruling determining its rights and liabilities under this Administrative Consent Order.

18. The provisions of this Order shall be binding on W. A. Cleary Chemical Corporation, its principals, agents, employees, successors, assigns, tenants and any trustee in bankruptcy—should such an entity be appointed to take control of the premises subject to this Order issued pursuant to the police powers of the State of New Jersey as necessary to the preservation of the public health, safety and welfare.

19. FORCE MAJEURE

W. A. Cleary shall not be responsible for failure to perform or for delay in the performance of its obligations hereunder where such failure or delay is beyond W. A. Cleary's control.

Should W. A. Cleary believe that such an event will occur or is occurring, it shall notify the NJDEP in writing, setting forth the nature of alleged delay, the extent of delay or anticipated delay, and the actions it has taken to avoid or minimize the delay. Failure by W. A. Cleary to strictly adhere to this notification requirement shall constitute complete and justifiable grounds for denial of the requested extension of any deadline.

20. HEARING WAIVER

When this Consent Order becomes effective, W. A. Cleary waives its right to a hearing on the matters contained hereinabove, except as specified in paragraph 17 above.

IN WITNESS WHEREOF, both parties have caused this Administrative Order to be signed and delivered as of the effective date.

BY AUTHORITY OF ARNOLD SCHIFFMAN, DIRECTOR
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

DATE: SEP 28 1982

George G. McCann
GEORGE G. MCCANN, ASSISTANT DIRECTOR

W. A. CLEARY CHEMICAL CORPORATION

DATE: Oct. 25, 1982

BY: Margaret Ann Cleary

NAME: MARGARET ANN CLEARY

TITLE: President

ATTACHMENT H

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
CN 029
TRENTON, NEW JERSEY 08625

J. W. GASTON JR., P.E.
DIRECTOR

DIRK C. HOFMAN, P.E.
DEPUTY DIRECTOR

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

January 23, 1986

Mr. Louis G. Ricciardi
W. A. Cleary Corporation
P. O. Box 10
1049 Somerset Street
Somerset, N. J. 08873

Re: Issuance of
NJPDES Permit NJ0003816
Effective Date:

Dear Mr. Ricciardi:

Enclosed is the final NJPDES Discharge to Ground Water Permit issued in accordance with the New Jersey Pollutant Discharge Elimination System Regulations, N.J.A.C. 7:14A-1 et seq. Violation of any condition of this permit may subject you to significant penalties.

All conditions included in the permit are the same as listed in your correspondence of December 6, 1985 except that pH has been added as a quarterly parameter in Table Number 1 for monitoring wells 3s, 3d, 5, 6 and 8s.

Within 30 calendar days following your receipt of this permit, under N.J.A.C. 7:14A-8.6 you may submit a request to the Administrator for an adjudicatory hearing to reconsider or contest the conditions of this permit. Regulations regarding the format and requirements for requesting an adjudicatory hearing may be found in N.J.A.C. 7:14A-8.9 through 8.13. The request should be sent to:

Administrator
Water Quality Management Element
Division of Water Resources
CN-029
Trenton, New Jersey 08625

ATTACHMENT F

DEPARTMENT OF ENVIRONMENTAL PROTECTION
CN 402
Trenton, N.J. 08625

PERMIT

New Jersey Department of Environmental Protection grants this permit in accordance with your application, attachments accompanying same application, and applicable laws and regulations. This permit is also subject to the further conditions stipulations enumerated in the supporting documents which are agreed to by the permittee upon acceptance of the permit.

Permit No.	Issuance Date	Effective Date	Expiration Date
NJ# 0003816	January 21, 1986	March 3, 1986	February 1, 1991

Name and Address of Applicant	Location of Activity/Facility	Name and Address of Owner
W.A. Cleary Corporation P.O. Box 10 1049 Somerset Street Somerset, NJ 08873	W.A. Cleary Corporation Franklin Township Somerset County	SAME AS APPLICANT

Issuing Division	Type of Permit	Statute(s)	Application No.
WATER RESOURCES	NJPDES/DGW	N.J.A.C. 58:10A-1 et seq.	

This permit grants permission to:

Discharge to ground waters of the state via three (3) settling ponds that are associated with discharges from the food additive building. The ponds consist of: a concrete tank, a bentonite lined lagoon and an unlined lagoon.

This permit requires the permittee to cease all discharges to the "chemical lagoon" associated with discharges from the agricultural building. Also, the permittee shall close the chemical lagoon and remove all contaminated liquid and solids in accordance with the conditions of this permit.

This permit also requires the installation of additional monitor wells to establish adequate ground water monitoring and determine the impact of past and present activities conducted at the facility on ground water.

Approved by the Department of Environmental Protection
BY AUTHORITY OF:
JOHN W. GASTON, JR., P.E.
DIRECTOR
DIVISION OF WATER RESOURCES

ARNOLD SCHIFFMAN, ADMINISTRATOR
WATER QUALITY MANAGEMENT

DATE

The word permit means "approval, certification, registration, etc."

(GENERAL CONDITIONS ARE ON THE REVERSE SIDE.)

Form DEP-007 (8/83)

ATTACHMENT I

FACT SHEET
FOR NJPDES PERMIT TO DISCHARGE
INTO THE GROUND WATER OF THE STA

Name and Address of Applicant
W.A. Cleary Corporation, Inc.
P.O. Box 10
1049 Somerset Street
Somerset, New Jersey 08873

Name and Address of Facility Where Discharge Occurs
W.A. Cleary Corporation, Inc.
1049 Somerset Street
Franklin Township, Somerset County
Somerset, New Jersey

Receiving Water
Ground Water of the State. The discharge is to the Brunswick Shale of Triassic Age.

Description of Facility
W.A. Cleary manufactures and formulates products used in the food and turf industry. The "chemical plant" contains several blend tanks for mixing agricultural chemicals such as: pesticides, herbicides, fungicides and green coloration for plant spray. The "food building" is used in the blending of food additives. The facility encompasses a 136 acre site with the two aforementioned buildings located along a small portion of the western edge. A miniature golf course, a 9 hole golf course, a driving range, fields, woods and a brook are also on site.

Description of Discharge
Wastewater is discharged from both the food additive building and the agriculture building. Wastewater from the food additive building, consisting primarily of vegetable oils and lecithins, is intermitantly discharged to the Raritan River via three (3) "settling ponds" consisting of: one underground cinder block tank, one bentonite lined lagoon and one unlined lagoon. Mico-organisms are maintained in the cinder block tank to digest the vegetable oils. The two (2) lagoons are located on the golf course. The tank and the lagoons are connected in series by underground piping and open ditchs. Surface water discharge is regulated by existing NPDES/NJPDES Discharge to Surface Water Permit NJ0003816.

Non-Recyclable wash water is discharge from the agriculture chemical section into a clay lined lagoon (hereinafter "chemical lagoon"). The "chemical lagoon" will be closed and all wastewater, sludge and contaminated soil will be removed in accordance with the conditions of this permit. W.A. Cleary intends to utilize a closed loop system and cease all discharge from the agriculture building.

Associated with this facility are potential sources of ground water contamination. These areas including a possible lagoon located near the reactor building, and areas of careless waste storage and/or waste spills will be addressed in this permit and cleaned up in accordance with the conditions of this permit.

Location of Discharge
Discharge occurs at the W.A. Cleary facility in Somerset, New Jersey.

Permit Conditions
According to the attached General and Specific Conditions.

I

CHAIN OF CUSTODY RECORD

ENVIRONMENTAL PROTECTION AGENCY – REGION II
SURVEILLANCE & ANALYSIS DIVISION
EDISON, NEW JERSEY 08817

File Cleary
NJ 0003816
Somerset County
Franklin Twp.

JUN ... NJDEP DIV WATER ... MS&E

Name of Unit and Address:
NJDEP DIV WATER RESOURCES
1474 Prospect St. Trenton 08625

Sample Number	Number of Containers	Description of Samples
G10753	1	Cleary lagoon – As, Hg
10754	1	Cleary prod well from well head
10755	1	Cleary runoff + effluent ditch
10756	1	Cleary – dug well off southern cor of barn
10758	1	Phillips – Med depth well
10759	1	Drayton – 41 Churchill Ave.
10760	1	Williams – 59 Churchill Avenue
10761	1	GARDNER – 78 Churchill Avenue
10762	1	Cherry – 85 Churchill Avenue
10763	1	Reed – 186 Churchill
10764	1	Gilbert Plastics – Veronica Avenue
10765	1	Barry – Rt 27 and Veronica Avenue

REPORT SUBMITTED
JUN 4 1981
NJDOH Environmental Chemistry Laboratory

Person Assuming Responsibility for Sample:	Time	Date
Charles Inversen	0930	81-05-13

Sample Number	Relinquished By:	Received By:	Time	Date	Reason for Change of Custody
All Above	Charles Inversen	Michael D. DiSalvo	3:00	5/13/81	lab analysis
All Above	Michael D. DiSalvo	William Sun	10:00	5/14/81	As, Cd
All Above	Michael D. DiSalvo	E. Halperin	10:30	5/14/81	Hg

Page No.

ATTACHMENT J

Form VST-001
8/79

STATE OF NEW JERSEY
Department of Environmental Protection
Water Analysis

PLEASE TYPE OR PRINT
WITH BALLPOINT PEN

BACT. LAB NO. _____
DATE REC'D. _____
BOTTLE NO. C10753
DATE REC'D. _____
STORET ENT. _____ READ _____

MUNICIPALITY FRANKLIN TWP	COUNTY SOMERSET	STREAM
FACILITY WA Clark	LOCATION Rt. 27	
REPRESENTATIVE EE	TITLE	COLL'NAME MILLER
REMARKS Lagoon - arsenic - mercury (bottom stirred, sample taken from middle		

Station Identification Number: SC, _____.
YR. MO. DAY: 810513
HOUR: 1040.
Sample No.: P8, _____.

FIELD ANALYSIS

- ☐ Water Temp °C P00010,
- ☐ D.O. - Winkler P00300,
- ☐ D.O. - Probe P00299,
- ☐ pH (Field) P00400,
- ☐ Sample Depth-ft. P00003,
- ☐ Stream Flow-CFS P00061,
- ☐ Gage Height-ft. P00065,
- ☐ Spec. Cond. @ 25°C P00095,
- ☐ Salinity °/00 P00480,
- ☐ Tide Stage P70211,

CONDITION CODES

- ☐ Weather Conditions P00041,
- ☐ Flow Severity P01351,
- ☐ _____ Severity P013__,
- ☐ _____ Severity P013__,

NUTRIENTS

LEVEL ☐ HIGH ☐ LOW

- ☐ NO_2 - N P00615,
- ☐ $NO_2 + NO_3$ - N P00630,
- ☐ NH_3 - N P00610,
- ☐ Tot Kjeldhal N P00625,
- Ortho - PO_4 as PO_4^P ☐ P671, ☐ P660,
- Phosphorus tot as PO_4^P ☐ P665, ☐ P650,

BACTERIOLOGICAL – DILUTIONS (REQUESTED)

	10	1	-1 10	-2 10	-3 10	-4 10	-5 10	-6 10
Fecal Coliform / Total Coliform								
Fecal Streptococci								

- Fecal coli #100 ml ☐ MPN P31615, ☐ MF P31613,
- ☐ Fecal Strept MPN/100ml P31677,
- ☐ Tot coli MPN/100 ml P31505,

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) _____ SAMPLE
SEED YES ☐ NO ☐
CONC. %
BOD _____
☐ BOD ☐ 5-DAY P310, ☐ 6-DAY P312,

- COD ☐ Low Level P335, ☐ High Level P340,
- ☐ TOC P00680,

- ☐ Color Pt - Cou P00080,
- ☐ Turbidity P00070,
- ☐ Suspended Solids P00530,
- ☐ Suspended Solids fixed P00540,
- ☐ Tot. Solids P00500,
- ☐ Tot. Solids - fixed P00510,
- ☐ Tot. Dissolved Solids (TDS) P70300,

- ☐ pH (LAB) P00400,
- ☐ Alkalinity as $CaCO_3$ P00410,
- ☐ Min. Acidity as $CaCO_3$ P00436,
- ☐ Chloride P00940,
- ☐ MBAS P38260,
- ☐ Phenols P32730,
- ☐ Hardness - tot as $CaCO_3$ P00900,
- ☐ Sulfate P00945,
- ☐ Oil & Grease P00556,
- ☐ Petroleum Hydrocarbons P45501,
- ☐ Cyanide P00720,

- ☑ As - tot ug/l P01002, 1173
- ☑ Cd - tot ug/l P01027, 19
- ☐ Cr - tot ug/l P01034,
- ☐ Cu - tot ug/l P01042,
- ☐ Fe - tot ug/l P01045,
- ☑ Hg - tot ug/l P71900, 40.0
- ☐ Mn - tot ug/l P01055,
- ☐ Ni - tot ug/l P01067,
- ☐ Pb - tot ug/l P01051,
- ☐ Zn - tot ug/l P01092,

ADDITIONAL ANALYSIS

- ☐ _____ P_____,
- ☐ _____ P_____,
- ☐ _____ P_____,

RESULTS mg/L unless otherwise noted

CHAIN OF CUSTODY

Date	Time	From (Name)	To (Name)
			REPORT SUBMITTED
			JUN 4 1981
			NJDOH Environmental

Review _____

Part 1(White) - Water Quality Inventory Copy
Part 2(Green) - Chemistry Copy
Part 3(Pink) - Water Resources Copy(For Transmission)
Part 4(Yellow) - Bacteriology Copy

ATTACHMENT J

Form VST-001 nun
8/79

COC

STATE OF NEW JERSEY
Department of Environmental Protection
Water Analysis

PLEASE TYPE OR PRINT WITH BALLPOINT PEN

MUNICIPALITY FRANKLIN TWP	COUNTY SOMERSET	STREAM	BACT. LAB NO.
FACILITY WA Clark	LOCATION JUNTLE RT 22		DATE REC'D.
REPRESENTATIVE EE		COLL NAME MILLER, McBride	BOTTLE NO. C10754
REMARKS Production well from well head BIV WATER RESOURCES MS&E			DATE REC'D.
			STORET ENT. READ

Station Identification Number: SC.

YR. MO. DAY: 810513

HOUR: 1105.

Sample No.: P8.

FIELD ANALYSIS

- ☐ Water Temp °C P00010,
- ☐ D.O. - Winkler P00300,
- ☐ D.O. - Probe P00299,
- ☐ pH (Field) P00400,
- ☐ Sample Depth-ft. P00003,
- ☐ Stream Flow-CFS P00061,
- ☐ Gage Height-ft. P00065,
- ☐ Spec. Cond. @ 25°C P00095,
- ☐ Salinity 0/00 P00480,
- ☐ Tide Stage P70211,

CONDITION CODES

- ☐ Weather Conditions P00041,
- ☐ Flow Severity P01351,
- ☐ _____ Severity P013__,
- ☐ _____ Severity P013__,

NUTRIENTS

LEVEL ☐ HIGH ☐ LOW

- ☐ NO_2 - N P00615,
- ☐ NO_2 - NO_3 - N P00630,
- ☐ NH_3 - N P00610,
- ☐ Tot Kjeldhal N P00625,
- Ortho - PO_4 as P: ☐ PO_4 P671, ☐ P660,
- Phosphorus tot as P: ☐ PO_4 P665, ☐ P650,

BACTERIOLOGICAL – DILUTIONS (REQUESTED)

	10	1	-1 10	-2 10	-3 10	-4 10	-5 10	-6 10
Fecal Coliform / Total Coliform								
Fecal Streptococci								

- Fecal coli #100 ml ☐ MPN P31615, ☐ MF P31613,
- ☐ Fecal Strept MPN/100ml P31677,
- ☐ Tot coli MPN/100 ml P31505,

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.)_____ SAMPLE

SEED YES NO

CONC.%

BOD_____

☐ BOD ☐ 5-DAY P310, ☐ 6-DAY P312,

- COD ☐ Low Level P335, ☐ High Level P340,
- ☐ TOC P00680,
- ☐ Color Pt - Cou P00080,
- ☐ Turbidity P00070,
- ☐ Suspended Solids P00530,
- ☐ Suspended Solids fixed P00540,
- ☐ Tot. Solids P00500,
- ☐ Tot. Solids - fixed P00510,
- ☐ Tot. Dissolved Solids (TDS) P70300,

- ☐ pH (LAB) P00400,
- ☐ Alkalinity as $CaCO_3$ P00410,
- ☐ Min. Acidity as $CaCO_3$ P00436,
- ☐ Chloride P00940,
- ☐ MBAS P38260,
- ☐ Phenols P32730,
- ☐ Hardness - tot as $CaCO_3$ P00900,
- ☐ Sulfate P00945,
- ☐ Oil & Grease P00556,
- ☐ Petroleum Hydrocarbons P45501,
- ☐ Cyanide P00720,

- ☑ As - tot ug/l P01002, 123
- ☑ Cd - tot ug/l P01027, 27
- ☐ Cr - tot ug/l P01034,
- ☐ Cu - tot ug/l P01042,
- ☐ Fe - tot ug/l P01045,
- ☑ Hg - tot ug/l P71900, 18.0
- ☐ Mn - tot ug/l P01055,
- ☐ Ni - tot ug/l P01067,
- ☐ Pb - tot ug/l P01051,
- ☐ Zn - tot ug/l P01092,

ADDITIONAL ANALYSIS

- ☐ _____ P_____,
- ☐ _____ P_____,
- ☐ _____ P_____,

RESULTS mg/L unless otherwise noted

Date	Time	CHAIN OF CUSTODY From (Name)	To (Name)

REPORT SUBMITTED
JUN 4 1981
NJDEP Environmental

Part 1(White) - Water Quality Inventory Copy
Part 2(Green) - Chemistry Copy
Part 3(Pink) - Water Resources Copy(For Transmission)
Part 4(Yellow) - Bacteriology Copy

ATTACHMENT J

8/79

Department of Environmental Protection
Water Analysis

PLEASE TYPE OR PRINT
WITH BALLPOINT PEN

MUNICIPALITY FRANKLIN TWP	COUNTY SOMERSET	STREAM
FACILITY WA Cleary	LOCATION Rt. 27	
REPRESENTATIVE EE	TITLE JUN 9 11	COLLECTOR MILLER, McBRIDE
REMARKS runoff + effluent ditch between 2 lagoons on golf course	DIV WATER RESOURCES MS&E	

BACT. LAB NO. _____
DATE REC'D. _____
BOTTLE NO. C10755
DATE REC'D. _____
STORET ENT. _____ READ _____

Station Identification Number: SC. _____ . | YR. MO. DAY: 810513 | HOUR: 1157. | Sample No.: P8. _____ .

FIELD ANALYSIS

- ☐ Water Temp °C P00010, _____
- ☐ D.O. - Winkler P00300, _____
- ☐ D.O. - Probe P00299, _____
- ☐ pH (Field) P00400, _____
- ☐ Sample Depth-ft. P00003, _____
- ☐ Stream Flow-CFS P00061, _____
- ☐ Gage Height-ft. P00065, _____
- ☐ Spec. Cond. @25°C P00095, _____
- ☐ Salinity °/00 P00480, _____
- ☐ Tide Stage P70211, _____

CONDITION CODES

- ☐ Weather Conditions P00041, _____
- ☐ Flow Severity P01351, _____
- ☐ _____ Severity P013_ _, _____
- ☐ _____ Severity P013_ _, _____

NUTRIENTS

LEVEL ☐ HIGH ☐ LOW

- ☐ NO_2 - N P00615, _____
- ☐ NO_2 - NO_3 - N P00630, _____
- ☐ NH_3 - N P00610, _____
- ☐ Tot Kjeldhal N P00625, _____
- Ortho - PO_4 as P: ☐ P671, ☐ P660, _____
- Phosphorus tot as P PO_4: ☐ P665, ☐ P650, _____

BACTERIOLOGICAL – DILUTIONS (REQUESTED)

	10	1	-1 10	-2 10	-3 10	-4 10	-5 10	-6 10
Fecal Coliform / Total Coliform								
Fecal Streptococci								

- Fecal coli #100 ml ☐ MPN P31615, ☐ MF P31613, _____
- ☐ Fecal Strept MPN/100ml P31677, _____
- ☐ Tot coli MPN/100 ml P31505, _____

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) _____ SAMPLE

SEED YES ☐ NO ☐

CONC. %			
BOD			

☐ BOD ☐ 5-DAY P310, ☐ 6-DAY P312, _____

- COD ☐ Low Level P335, ☐ High Level P340, _____
- ☐ TOC P00680, _____

- ☐ Color Pt - Cou P00080, _____
- ☐ Turbidity P00070, _____
- ☐ Suspended Solids P00530, _____
- ☐ Suspended Solids fixed P00540, _____
- ☐ Tot. Solids P00500, _____
- ☐ Tot. Solids - fixed P00510, _____
- ☐ Tot. Dissolved Solids (TDS) P70300, _____

- ☐ pH (LAB) P00400, _____
- ☐ Alkalinity as $CaCO_3$ P00410, _____
- ☐ Min. Acidity as $CaCO_3$ P00436, _____
- ☐ Chloride P00940, _____
- ☐ MBAS P38260, _____
- ☐ Phenols P32730, _____
- ☐ Hardness - tot as $CaCO_3$ P00900, _____
- ☐ Sulfate P00945, _____
- ☐ Oil & Grease P00556, _____
- ☐ Petroleum Hydrocarbons P45501, _____
- ☐ Cyanide P00720, _____

- ☑ As - tot ug/l P01002, 276
- ☑ Cd - tot ug/l P01027, 21
- ☐ Cr - tot ug/l P01034, _____
- ☐ Cu - tot ug/l P01042, _____
- ☐ Fe - tot ug/l P01045, _____
- ☑ Hg - tot ug/l P71900, 9.0
- ☐ Mn - tot ug/l P01055, _____
- ☐ Ni - tot ug/l P01067, _____
- ☐ Pb - tot ug/l P01051, _____
- ☐ Zn - tot ug/l P01092, _____

ADDITIONAL ANALYSIS

- ☐ _____ P_____, _____
- ☐ _____ P_____, _____
- ☐ _____ P_____, _____

RESULTS mg/L unless otherwise noted

CHAIN OF CUSTODY

Date	Time	From (Name)	To (Name)
			REPORT SUBMITTED
			JUN 4 1981
			NJDEP Environmental

Review _____

Part 1(White) - Water Quality Inventory Copy
Part 2(Green) - Chemistry Copy
Part 3(Pink) - Water Resources Copy(For Transmission)
Part 4(Yellow) - Bacteriology Copy

ATTACHMENT J

Form VST-001 8/79 *nun*

PLEASE TYPE OR PRINT WITH BALLPOINT PEN

STATE OF NEW JERSEY
Department of Environmental Protection
Water Analysis

BACT. LAB NO.	
DATE REC'D.	
BOTTLE NO.	C 10756
DATE REC'D.	
STORET	ENT. / READ

MUNICIPALITY: FRANKLIN TWP	COUNTY: SOMERSET	STREAM
FACILITY: WA Cleary	LOCATION: Rt-27	
REPRESENTATIVE: EE	TITLE	COLL. NAME: MILLER
REMARKS: dug well off southern corner of house		

RECEIVED JUN 9 1981 NJ DIV WATER RESOURCES MS&E

Station Identification Number	YR. MO. DAY	HOUR	Sample No.
SC,	810513	1203.	P8,

FIELD ANALYSIS

☐ Water Temp °C	P00010,	
☐ D.O. - Winkler	P00300,	
☐ D.O. - Probe	P00299,	
☐ pH (Field)	P00400,	
☐ Sample Depth-ft.	P00003,	
☐ Stream Flow-CFS	P00061,	
☐ Gage Height-ft.	P00065,	
☐ Spec. Cond. @ 25°C	P00095,	
☐ Salinity 0/00	P00480,	
☐ Tide Stage	P70211,	

CONDITION CODES

☐ Weather Conditions	P00041,	
☐ Flow Severity	P01351,	
☐ ______ Severity	P013__,	
☐ ______ Severity	P013__,	

NUTRIENTS

LEVEL ☐ HIGH ☐ LOW

☐ NO_2 - N	P00615,	
☐ $NO_2 + NO_3$ - N	P00630,	
☐ NH_3 - N	P00610,	
☐ Tot Kjeldhal N	P00625,	
Ortho - PO_4 as P / PO_4	☐ P671, ☐ P660,	
Phosphorus-tot as P / PO_4	☐ P665, ☐ P650,	

BACTERIOLOGICAL – DILUTIONS (REQUESTED)

Fecal Coliform / Total Coliform	10	1	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}
Fecal Streptococci	10	1	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}

Fecal coli #100 ml	☐ MPN P31615, ☐ MF P31613,	
☐ Fecal Strept MPN/100ml	P31677,	
☐ Tot coli MPN/100 ml	P31505,	

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) ________ SAMPLE

SEED YES ☐ NO ☐

CONC. %

BOD __

☐ BOD ☐ 5-DAY P310, ☐ 6-DAY P312,

COD	☐ Low Level P335, ☐ High Level P340,	
☐ TOC	P00680,	
☐ Color Pt - Cou	P00080,	
☐ Turbidity	P00070,	
☐ Suspended Solids	P00530,	
☐ Suspended Solids fixed	P00540,	
☐ Tot. Solids	P00500,	
☐ Tot. Solids - fixed	P00510,	
☐ Tot. Dissolved Solids (TDS)	P70300,	

☐ pH (LAB)	P00400,	
☐ Alkalinity as $CaCo_3$	P00410,	
☐ Min. Acidity as $CaCo_3$	P00436,	
☐ Chloride	P00940,	
☐ MBAS	P38260,	
☐ Phenols	P32730,	
☐ Hardness - tot as $CaCo_3$	P00900,	
☐ Sulfate	P00945,	
☐ Oil & Grease	P00556,	
☐ Petroleum Hydrocarbons	P45501,	
☐ Cyanide	P00720,	
☑ As - tot ug/l	P01002,	9
☑ Cd - tot ug/l	P01027,	1K
☐ Cr - tot ug/l	P01034,	
☐ Cu - tot ug/l	P01042,	
☐ Fe - tot ug/l	P01045,	
☑ Hg - tot ug/l	P71900,	.6
☐ Mn - tot ug/l	P01055,	
☐ Ni - tot ug/l	P01067,	
☐ Pb - tot ug/l	P01051,	
☐ Zn - tot ug/l	P01092,	

ADDITIONAL ANALYSIS

☐ ______ P______,
☐ ______ P______,
☐ ______ P______,

RESULTS mg/L unless otherwise noted

CHAIN OF CUSTODY

Date	Time	From (Name)	To (Name)
			REPORT SUBMITTED
			JUN 1 1981

Chemist Review ______

Part 1(White) - Water Quality Inventory Copy
Part 2(Green) - Chemistry Copy
Part 3(Pink) - Water Resources Copy (For Transmission)
Part 4(Yellow) - Bacteriology Copy

ATTACHMENT J

Form VST-001
8/79

STATE OF NEW JERSEY
Department of Environmental Protection
Water Analysis

PLEASE TYPE OR PRINT WITH BALLPOINT PEN

MUNIC: FRANKLIN TWP	COUNTY: SOMERSET	STREAM:
FACILITY: PHILLIPS	LOCATION: MED WELL 250 FEET	
REPRESENTATIVE: E E	TITLE:	COLLECTOR'S NAME: Iverson
REMARKS: NJDEP DIV WATER RESOURCES MS&E		

BACT. LAB NO. _____
DATE REC'D. _____
BOTTLE NO. C10758
DATE REC'D. _____
STORET ENT. _____ READ _____

Station Identification Number	YR. MO. DAY	HOUR	Sample No.
SC.	810513	0930	PB.

FIELD ANALYSIS

- ☐ Water Temp °C P00010,
- ☐ D.O. - Winkler P00300,
- ☐ D.O. - Probe P00299,
- ☐ pH (Field) P00400,
- ☐ Sample Depth-ft. P00003,
- ☐ Stream Flow-CFS P00061,
- ☐ Gage Height-ft. P00065,
- ☐ Spec. Cond. @ 25°C P00095,
- ☐ Salinity ‰ P00480,
- ☐ Tide Stage P70211,

CONDITION CODES

- ☐ Weather Conditions P00041,
- ☐ Flow Severity P01351,
- ☐ _____ Severity P013__,
- ☐ _____ Severity P013__,

NUTRIENTS

LEVEL ☐ HIGH ☐ LOW

- ☐ NO_2 - N P00615,
- ☐ $NO_2 + NO_3$ N P00630,
- ☐ NH_3 - N P00610,
- ☐ Tot Kjeldhal N P00625,
- Ortho - PO_4 as P: ☐ P671, ☐ P660,
- Phosphorus tot as P: ☐ P665, ☐ P650,

BACTERIOLOGICAL – DILUTIONS (REQUESTED)

	10	1	-1	-2	-3	-4	-5	-6
Fecal Coliform / Total Coliform	10	1	-1 10	-2 10	-3 10	-4 10	-5 10	-6 10
Fecal Streptococci	10	1	-1 10	-2 10	-3 10	-4 10	-5 10	-6 10

- Fecal coli #100 ml ☐ MPN P31615, ☐ MF P31613,
- ☐ Fecal Strept MPN/100ml P31677,
- ☐ Tot coli MPN/100 ml P31505,

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.)_____SAMPLE

SEED YES ☐ NO ☐

CONC. % | | |

BOD _ | | |

☐ BOD ☐ 5-DAY P310, ☐ 6-DAY P312,

- COD ☐ Low Level P335, ☐ High Level P340,
- ☐ TOC P00680,
- ☐ Color Pt - Cou P00080,
- ☐ Turbidity P00070,
- ☐ Suspended Solids P00530,
- ☐ Suspended Solids fixed P00540,
- ☐ Tot. Solids P00500,
- ☐ Tot. Solids - fixed P00510,
- ☐ Tot. Dissolved Solids (TDS) P70300,

- ☐ pH (LAB) P00400,
- ☐ Alkalinity as $CaCO_3$ P00410,
- ☐ Min. Acidity as $CaCO_3$ P00436,
- ☐ Chloride P00940,
- ☐ MBAS P38260,
- ☐ Phenols P32730,
- ☐ Hardness - tot as $CaCO_3$ P00900,
- ☐ Sulfate P00945,
- ☐ Oil & Grease P00556,
- ☐ Petroleum Hydrocarbons P45501,
- ☐ Cyanide P00720,

- ☑ As - tot ug/l P01002, 14
- ☑ Cd - tot ug/l P01027, 1K
- ☐ Cr - tot ug/l P01034,
- ☐ Cu - tot ug/l P01042,
- ☐ Fe - tot ug/l P01045,
- ☑ Hg - tot ug/l P71900, .5K
- ☐ Mn - tot ug/l P01055,
- ☐ Ni - tot ug/l P01067,
- ☐ Pb - tot ug/l P01051,
- ☐ Zn - tot ug/l P01092,

ADDITIONAL ANALYSIS

- ☐ _____ P_____,
- ☐ _____ P_____,
- ☐ _____ P_____,

RESULTS mg/L unless otherwise noted

CHAIN OF CUSTODY

Date	Time	From (Name)	To (Name)
			REPORT SUBMITTED
			JUN 4 1981

Comments: _____

Part 1(White) - Water Quality Inventory Copy
Part 2(Green) - Chemistry Copy
Part 3(Pink) - Water Resources Copy (For Transmission)
Part 4(Yellow) - Bacteriology Copy

Laboratory

ATTACHMENT J

Form VST-001 *nun*
8/79

PLEASE TYPE OR PRINT
WITH BALLPOINT PEN

STATE OF NEW JERSEY
Department of Environmental Protection
Water Analysis

MUNICIPALITY: FRANKLIN TWP	COUNTY: SOMERSET	STREAM: WELL
FACILITY: DRAYTON	LOCATION: 41 CHURCHILL AVE	
REPRESENTATIVE: EE	TITLE	COLL. NAME
REMARKS		

JUN
NJ...
DIV WAT...
WSPE

BACT. LAB NO.	
DATE REC'D.	
BOTTLE NO.	C1C759
DATE REC'D.	
STORET ENT.	
STORET READ	

Station Identification Number	YR. MO. DAY	HOUR	Sample No.
S C ,	8 1 0 5 1 3	0 9 5 0	P 8 ,

FIELD ANALYSIS

Parameter	Code	Value
☐ Water Temp °C	P00010,	
☐ D.O. - Winkler	P00300,	
☐ D.O. - Probe	P00299,	
☐ pH (Field)	P00400,	
☐ Sample Depth-ft.	P00003,	
☐ Stream Flow-CFS	P00061,	
☐ Gage Height-ft.	P00065,	
☐ Spec. Cond. @ 25 °C	P00095,	
☐ Salinity ⁰/₀₀	P00480,	
☐ Tide Stage	P70211,	

CONDITION CODES

Parameter	Code	Value
☐ Weather Conditions	P00041,	
☐ Flow Severity	P01351,	
☐ ______ Severity	P013__,	
☐ ______ Severity	P013__,	

NUTRIENTS

LEVEL ☐ HIGH ☐ LOW

Parameter	Code	Value
☐ NO_2 - N	P00615,	
☐ NO_2 - NO_3 - N	P00630,	
☐ NH_3 - N	P00610,	
☐ Tot Kjeldahl N	P00625,	
Ortho - PO_4 as P / PO_4	☐ P671, ☐ P660,	
Phosphorus tot as P / PO_4	☐ P665, ☐ P650,	

BACTERIOLOGICAL – DILUTIONS (REQUESTED)

	10	1	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}
Fecal Coliform / Total Coliform								
Fecal Streptococci								

Parameter	Code	Value
Fecal coli #100 ml ☐ MPN	P31615,	
☐ MF	P31613,	
☐ Fecal Strept MPN/100ml	P31677,	
☐ Tot coli MPN/100 ml	P31505,	

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) ________ SAMPLE

SEED YES NO

CONC. %

BOD __

Parameter	Code	Value
☐ BOD ☐ 5-DAY	P310,	
☐ 6-DAY	P312,	
COD ☐ Low Level	P335,	
☐ High Level	P340,	
☐ TOC	P00680,	
☐ Color Pt - Cou	P00080,	
☐ Turbidity	P00070,	
☐ Suspended Solids	P00530,	
☐ Suspended Solids fixed	P00540,	
☐ Tot. Solids	P00500,	
☐ Tot. Solids - fixed	P00510,	
☐ Tot. Dissolved Solids (TDS)	P70300,	

Parameter	Code	Value
☐ pH (LAB)	P00400,	
☐ Alkalinity as $CaCo_3$	P00410,	
☐ Min. Acidity as $CaCo_3$	P00436,	
☐ Chloride	P00940,	
☐ MBAS	P38260,	
☐ Phenols	P32730,	
☐ Hardness - tot as $CaCo_3$	P00900,	
☐ Sulfate	P00945,	
☐ Oil & Grease	P00556,	
☐ Petroleum Hydrocarbons	P45501,	
☐ Cyanide	P00720,	
☑ As - tot ug/l	P01002,	9
☑ Cd - tot ug/l	P01027,	1K
☐ Cr - tot ug/l	P01034,	
☐ Cu - tot ug/l	P01042,	
☐ Fe - tot ug/l	P01045,	
☑ Hg - tot ug/l	P71900,	.5K
☐ Mn - tot ug/l	P01055,	
☐ Ni - tot ug/l	P01067,	
☐ Pb - tot ug/l	P01051,	
☐ Zn - tot ug/l	P01092,	

ADDITIONAL ANALYSIS

☐ ______	P______,	
☐ ______	P______,	
☐ ______	P______,	

RESULTS mg/L unless otherwise noted

CHAIN OF CUSTODY

Date	Time	From (Name)	To (Name)
			REPORT SUBMITTED
			JUN 4 1981

Review ______

Part 1(White) - Water Quality Inventory Copy
Part 2(Green) - Chemistry Copy
Part 3(Pink) - Water Resources Copy (For Transmission)
Part 4(Yellow) - Bacteriology Copy

ATTACHMENT J

Form VST-001 8/79

PLEASE TYPE OR PRINT WITH BALLPOINT PEN

COC 14

STATE OF NEW JERSEY
Department of Environmental Protection
Water Analysis

BACT. LAB NO.	
DATE REC'D.	
BOTTLE NO.	C10760
DATE REC'D.	
STORET ENT.	
STORET READ	

MUNICIPALITY FRANKLIN TWP	COUNTY SOMERSET	STREAM WELL
FACILITY WILLIAMS	LOCATION 59 CHURCHILL AVE	
REPRESENTATIVE EE	TITLE	COLL. NAME
REMARKS		

JUN
BIV WATER
MS&E

Station Identification Number	YR. MO. DAY	HOUR	Sample No.
S C ,	810513	1005	P 8 ,

FIELD ANALYSIS

☐ Water Temp °C	P00010,	
☐ D.O. - Winkler	P00300,	
☐ D.O. - Probe	P00299,	
☐ pH (Field)	P00400,	
☐ Sample Depth-ft.	P00003,	
☐ Stream Flow-CFS	P00061,	
☐ Gage Height-ft.	P00065,	
☐ Spec. Cond. @ 25°C	P00095,	
☐ Salinity °/00	P00480,	
☐ Tide Stage	P70211,	

CONDITION CODES

☐ Weather Conditions	P00041,	
☐ Flow Severity	P01351,	
☐ ________ Severity	P013__,	
☐ ________ Severity	P013__,	

NUTRIENTS

LEVEL ☐ HIGH ☐ LOW

☐ NO_2 - N	P00615,	
☐ NO_2 - NO_3 N	P00630,	
☐ NH_3 N	P00610,	
☐ Tot Kjeldhal N	P00625,	
Ortho - PO_4 as P / PO_4	☐ P671, ☐ P660,	
Phosphorus tot as P / PO_4	☐ P665, ☐ P650,	

BACTERIOLOGICAL – DILUTIONS (REQUESTED)

Fecal Coliform / Total Coliform	10	1	10⁻¹	10⁻²	10⁻³	10⁻⁴	10⁻⁵	10⁻⁶
Fecal Streptococci	10	1	10⁻¹	10⁻²	10⁻³	10⁻⁴	10⁻⁵	10⁻⁶

Fecal coli #100 ml	☐ MPN P31615, ☐ MF P31613,	
☐ Fecal Strept MPN/100ml	P31677,	
☐ Tot coli MPN/100 ml	P31505,	

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) ________ SAMPLE

SEED YES NO

CONC. %			
BOD			

☐ BOD ☐ 5-DAY P310, ☐ 6-DAY P312,

COD	☐ Low Level P335, ☐ High Level P340,	
☐ TOC	P00680,	

☐ Color Pt - Cou	P00080,	
☐ Turbidity	P00070,	
☐ Suspended Solids	P00530,	
☐ Suspended Solids fixed	P00540,	
☐ Tot. Solids	P00500,	
☐ Tot. Solids - fixed	P00510,	
☐ Tot. Dissolved Solids (TDS)	P70300,	

☐ pH (LAB)	P00400,	
☐ Alkalinity as $CaCO_3$	P00410,	
☐ Min. Acidity as $CaCO_3$	P00436,	
☐ Chloride	P00940,	
☐ MBAS	P38250,	
☐ Phenols	P32730,	
☐ Hardness - tot as $CaCO_3$	P00900,	
☐ Sulfate	P00945,	
☐ Oil & Grease	P00556,	
☐ Petroleum Hydrocarbons	P45501,	
☐ Cyanide	P00720,	

☑ As - tot ug/l	P01002,	2
☑ Cd - tot ug/l	P01027,	1K
☐ Cr - tot ug/l	P01034,	
☐ Cu - tot ug/l	P01042,	
☐ Fe - tot ug/l	P01045,	
☑ Hg - tot ug/l	P71900,	.5K
☐ Mn - tot ug/l	P01055,	
☐ Ni - tot ug/l	P01067,	
☐ Pb - tot ug/l	P01051,	
☐ Zn - tot ug/l	P01092,	

ADDITIONAL ANALYSIS

☐ ________	P________,	
☐ ________	P________,	
☐ ________	P________,	

RESULTS mg/L unless otherwise noted

CHAIN OF CUSTODY

Date	Time	From (Name)	To (Name)
			REPORT SUBMITTED
			JUN 4 1981

Review ________

Part 1(White) - Water Quality Inventory Copy
Part 2(Green) - Chemistry Copy
Part 3(Pink) - Water Resources Copy(For Transmission)
Part 4(Yellow) - Bacteriology Copy

ATTACHMENT J

Form VST-001
8/79

STATE OF NEW JERSEY
Department of Environmental Protection
Water Analysis

PLEASE TYPE OR PRINT WITH BALLPOINT PEN

MUNICIPALITY FRANKLIN TWP	COUNTY SOMERSET	STREAM WELL
FACILITY GARDNER	LOCATION 78 S. HAROLD HILL AVE	
REPRESENTATIVE EE	TITLE	COLL NAME
REMARKS WATER COMES OUT THRU A TANK PUMP RUNS 15 MINS NOT A FILTER		

BACT. LAB NO. _____
DATE REC'D. _____
BOTTLE NO. C10761
DATE REC'D. _____
STORET ENT. _____ READ _____

Station Identification Number	YR. MO. DAY	HOUR	Sample No.
SC,	910513	1100	P8,

FIELD ANALYSIS

- ☐ Water Temp °C P00010,
- ☐ D.O. - Winkler P00300,
- ☐ D.O. - Probe P00299,
- ☐ pH (Field) P00400,
- ☐ Sample Depth-ft. P00003,
- ☐ Stream Flow-CFS P00061,
- ☐ Gage Height-ft. P00065,
- ☐ Spec. Cond. @25°C P00095,
- ☐ Salinity ‰ P00480,
- ☐ Tide Stage P70211,

CONDITION CODES

- ☐ Weather Conditions P00041,
- ☐ Flow Severity P01351,
- ☐ _____ Severity P013__,
- ☐ _____ Severity P013__,

NUTRIENTS

LEVEL ☐ HIGH ☐ LOW

- ☐ NO_2 - N P00615,
- ☐ NO_2 - NO_3 - N P00630,
- ☐ NH_3 - N P00610,
- ☐ Tot Kjeldhal N P00625,
- Ortho - PO_4 as P ☐ P671, ☐ P660,
- Phosphorus tot as PO_4 ☐ P665, ☐ P650,

BACTERIOLOGICAL – DILUTIONS (REQUESTED)

	10	1	-1 10	-2 10	-3 10	-4 10	-5 10	-6 10
Fecal Coliform Total Coliform								
Fecal Streptococci								

- Fecal coli #100 ml ☐ MPN P31615, ☐ MF P31613,
- ☐ Fecal Strept MPN/100ml P31677,
- ☐ Tot coli MPN/100 ml P31505,

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) _____ SAMPLE

SEED YES NO

CONC. %			
BOD _			

☐ BOD ☐ 5-DAY P310, ☐ 6-DAY P312,

- COD ☐ Low Level P335, ☐ High Level P340,
- ☐ TOC P00680,
- ☐ Color Pt - Cou P00080,
- ☐ Turbidity P00070,
- ☐ Suspended Solids P00530,
- ☐ Suspended Solids fixed P00540,
- ☐ Tot. Solids P00500,
- ☐ Tot. Solids - fixed P00510,
- ☐ Tot. Dissolved Solids (TDS) P70300,

- ☐ pH (LAB) P00400,
- ☐ Alkalinity as $CaCO_3$ P00410,
- ☐ Min. Acidity as $CaCO_3$ P00436,
- ☐ Chloride P00940,
- ☐ MBAS P38260,
- ☐ Phenols P32730,
- ☐ Hardness - tot as $CaCO_3$ P00900,
- ☐ Sulfate P00945,
- ☐ Oil & Grease P00556,
- ☐ Petroleum Hydrocarbons P45501,
- ☐ Cyanide P00720,

- ☑ As - tot ug/l P01002, 3
- ☑ Cd - tot ug/l P01027, 1K
- ☐ Cr - tot ug/l P01034,
- ☐ Cu - tot ug/l P01042,
- ☐ Fe - tot ug/l P01045,
- ☑ Hg - tot ug/l P71900, .5K
- ☐ Mn - tot ug/l P01055,
- ☐ Ni - tot ug/l P01067,
- ☐ Pb - tot ug/l P01051,
- ☐ Zn - tot ug/l P01092,

ADDITIONAL ANALYSIS

- ☐ _____ P_____,
- ☐ _____ P_____,
- ☐ _____ P_____,

RESULTS mg/L unless otherwise noted

Date	Time	CHAIN OF CUSTODY From (Name)	To (Name)
			REPORT SUBMITTED
			JUN 4 1991
			NJDEP Environmental

Review _____

Part 1(White) - Water Quality Inventory Copy
Part 2(Green) - Chemistry Copy
Part 3(Pink) - Water Resources Copy(For Transmission)
Part 4(Yellow) - Bacteriology Copy

ATTACHMENT J

Form VST-001 *[handwritten initials]*
8/79

PLEASE TYPE OR PRINT WITH BALLPOINT PEN

STATE OF NEW JERSEY
Department of Environmental Protection
Water Analysis

COC

BACT. LAB NO.	
DATE REC'D.	
BOTTLE NO.	C10762
DATE REC'D.	
STORET ENT.	
STORET READ	

MUNICIPALITY: FRANKLIN TWP	COUNTY: SOMERSET	STREAM: WELL
FACILITY: CHERRY	LOCATION: 85 CHURCHILL AVENUE	
REPRESENTATIVE: EE	TITLE:	COLL. NAME: JUN 3 ... ERDRUSEN
REMARKS:		

NJ... DIV WA... MS&E

Station Identification Number	YR. MO. DAY	HOUR	Sample No.
S C ,	81 05 13	1115	P 8 ,

FIELD ANALYSIS

☐ Water Temp °C	P00010,	
☐ D.O. - Winkler	P00300,	
☐ D.O. - Probe	P00299,	
☐ pH (Field)	P00400,	
☐ Sample Depth-ft.	P00003,	
☐ Stream Flow-CFS	P00061,	
☐ Gage Height-ft.	P00065,	
☐ Spec. Cond. @ 25 °C	P00095,	
☐ Salinity ‰	P00480,	
☐ Tide Stage	P70211,	

CONDITION CODES

☐ Weather Conditions	P00041,	
☐ Flow Severity	P01351,	
☐ ________ Severity	P013_ _,	
☐ ________ Severity	P013_ _,	

NUTRIENTS

LEVEL ☐ HIGH ☐ LOW

☐ NO_2 - N	P00615,	
☐ NO_2 - NO_3 N	P00630,	
☐ NH_3 - N	P00610,	
☐ Tot Kjeldhal N	P00625,	
Ortho - PO_4 as P / PO_4	☐ P671, ☐ P660,	
Phosphorus tot as P / PO_4	☐ P665, ☐ P650,	

BACTERIOLOGICAL – DILUTIONS (REQUESTED)

	10	1	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}
Fecal Coliform / Total Coliform								
Fecal Streptococci								

Fecal coli #100 ml	☐ MPN	P31615,	
	☐ MF	P31613,	
☐ Fecal Strept MPN/100ml		P31677,	
☐ Tot coli MPN/100 ml		P31505,	

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) __________ SAMPLE

SEED YES ___ NO ___

CONC. %

BOD ___

☐ BOD ☐ 5-DAY P310, ☐ 6-DAY P312,

COD	☐ Low Level	P335,	
	☐ High Level	P340,	
☐ TOC		P00680,	

☐ Color Pt - Cou	P00080,	
☐ Turbidity	P00070,	
☐ Suspended Solids	P00530,	
☐ Suspended Solids fixed	P00540,	
☐ Tot. Solids	P00500,	
☐ Tot. Solids - fixed	P00510,	
☐ Tot. Dissolved Solids (TDS)	P70300,	

☐ pH (LAB)	P00400,	
☐ Alkalinity as $CaCO_3$	P00410,	
☐ Min. Acidity as $CaCO_3$	P00436,	
☐ Chloride	P00940,	
☐ MBAS	P38260,	
☐ Phenols	P32730,	
☐ Hardness - tot as $CaCO_3$	P00900,	
☐ Sulfate	P00945,	
☐ Oil & Grease	P00556,	
☐ Petroleum Hydrocarbons	P45501,	
☐ Cyanide	P00720,	
☑ As - tot ug/l	P01002,	4
☑ Cd - tot ug/l	P01027,	1K
☐ Cr - tot ug/l	P01034,	
☐ Cu - tot ug/l	P01042,	
☐ Fe - tot ug/l	P01045,	
☑ Hg - tot ug/l	P71900,	.5K
☐ Mn - tot ug/l	P01055,	
☐ Ni - tot ug/l	P01067,	
☐ Pb - tot ug/l	P01051,	
☐ Zn - tot ug/l	P01092,	

ADDITIONAL ANALYSIS

☐ ________	P________,	
☐ ________	P________,	
☐ ________	P________,	

RESULTS mg/L unless otherwise noted

CHAIN OF CUSTODY

Date	Time	From (Name)	To (Name)
			REPORT SUBMITTED
			JUN 4 1981
			NJDEP ...
			...

... Review ________________

Part 1 (White) - Water Quality Inventory Copy
Part 2 (Green) - Chemistry Copy
Part 3 (Pink) - Water Resources Copy (For Transmission)
Part 4 (Yellow) - Bacteriology Copy

ATTACHMENT J

Form VST-001
8/79

PLEASE TYPE OR PRINT
WITH BALLPOINT PEN

STATE OF NEW JERSEY
Department of Environmental Protection
Water Analysis

4

BACT. LAB NO. _____
DATE REC'D. _____
BOTTLE NO. C10763
DATE REC'D. _____
STORET ENT. _____ READ _____

MUNICIPALITY FRANKLIN TWP	COUNTY SOMERSET	STREAM WELL
FACILITY REED	LOCATION 186 CHURCHILL	
REPRESENTATIVE EG	TITLE	CALL-IN DATE JUN 9 11:14 AM '81
REMARKS INSIDE - KITCHEN FAUCET		

DIV WATER RESOURCES
MSSE

Station Identification Number	YR.	MO.	DAY	HOUR	Sample No.
SC,	81	05	13	1145	P8,

FIELD ANALYSIS

- ☐ Water Temp °C P00010,
- ☐ D.O. - Winkler P00300,
- ☐ D.O. - Probe P00299,
- ☐ pH (Field) P00400,
- ☐ Sample Depth-ft. P00003,
- ☐ Stream Flow-CFS P00061,
- ☐ Gage Height-ft. P00065,
- ☐ Spec. Cond. @25°C P00095,
- ☐ Salinity °/00 P00480,
- ☐ Tide Stage P70211,

CONDITION CODES

- ☐ Weather Conditions P00041,
- ☐ Flow Severity P01351,
- ☐ _____ Severity P013__,
- ☐ _____ Severity P013__,

NUTRIENTS

LEVEL ☐ HIGH ☐ LOW

- ☐ NO_2 - N P00615,
- ☐ NO_2 - NO_3 - N P00630,
- ☐ NH_3 - N P00610,
- ☐ Tot Kjeldhal N P00625,
- Ortho - PO_4 as PO_4 ☐ P671, ☐ P660,
- Phosphorus-tot as PO_4 ☐ P665, ☐ P650,

BACTERIOLOGICAL – DILUTIONS (REQUESTED)

	10	1	-1 10	-2 10	-3 10	-4 10	-5 10	-6 10
Fecal Coliform / Total Coliform								
Fecal Streptococci								

- Fecal coli #100 ml ☐ MPN P31615, ☐ MF P31613,
- ☐ Fecal Strept MPN/100ml P31677,
- ☐ Tot coli MPN/100 ml P31505,

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.)_____ SAMPLE

SEED YES ☐ NO ☐

CONC. %

BOD _

☐ BOD ☐ 5-DAY P310, ☐ 6-DAY P312,

COD

☐ Low Level P335, ☐ High Level P340,

- ☐ TOC P00680,
- ☐ Color Pt - Cou P00080,
- ☐ Turbidity P00070,
- ☐ Suspended Solids P00530,
- ☐ Suspended Solids fixed P00540,
- ☐ Tot. Solids P00500,
- ☐ Tot. Solids - fixed P00510,
- ☐ Tot. Dissolved Solids (TDS) P70300,

- ☐ pH (LAB) P00400,
- ☐ Alkalinity as $CaCO_3$ P00410,
- ☐ Min. Acidity as $CaCO_3$ P00436,
- ☐ Chloride P00940,
- ☐ MBAS P38260,
- ☐ Phenols P32730,
- ☐ Hardness - tot as $CaCO_3$ P00900,
- ☐ Sulfate P00945,
- ☐ Oil & Grease P00556,
- ☐ Petroleum Hydrocarbons P45501,
- ☐ Cyanide P00720,

- ☑ As - tot ug/l P01002, 4
- ☑ Cd - tot ug/l P01027, 1K
- ☐ Cr - tot ug/l P01034,
- ☐ Cu - tot ug/l P01042,
- ☐ Fe - tot ug/l P01045,
- ☑ Hg - tot ug/l P71900, .5K
- ☐ Mn - tot ug/l P01055,
- ☐ Ni - tot ug/l P01067,
- ☐ Pb - tot ug/l P01051,
- ☐ Zn - tot ug/l P01092,

ADDITIONAL ANALYSIS

- ☐ _____ P_____,
- ☐ _____ P_____,
- ☐ _____ P_____,

RESULTS mg/L unless otherwise noted

Date	Time	CHAIN OF CUSTODY From (Name)	To (Name)

REPORT SUBMITTED
JUN 4 1981
NJDEP Environmental

Remarks _____

Part 1(White) - Water Quality Inventory Copy Part 3(Pink) - Water Resources Copy(For Transmission)
Part 2(Green) - Chemistry Copy Part 4(Yellow) - Bacteriology Copy

ATTACHMENT J

Form VST-001 8/79

STATE OF NEW JERSEY
Department of Environmental Protection
Water Analysis

PLEASE TYPE OR PRINT WITH BALLPOINT PEN

MUNICIPALITY: Franklin Twp	COUNTY: Somerset	STREAM: Well
FACILITY: Gilbert Plastics	LOCATION: Veronica Ave	
REPRESENTATIVE: EE	TITLE	COLL-NAME:
REMARKS: At wellhead Production well		

BACT. LAB NO.	
DATE REC'D.	
BOTTLE NO.	C10764
DATE REC'D.	
STORET	ENT. / READ

DIV WA... MS&E

Station Identification Number	YR. MO. DAY	HOUR	Sample No.
S C ,	810513	1200	P 8 ,

FIELD ANALYSIS

Parameter	Code	Result
☐ Water Temp °C	P00010,	
☐ D.O. - Winkler	P00300,	
☐ D.O. - Probe	P00299,	
☐ pH (Field)	P00400,	
☐ Sample Depth-ft.	P00003,	
☐ Stream Flow-CFS	P00061,	
☐ Gage Height-ft.	P00065,	
☐ Spec. Cond. @ 25°C	P00095,	
☐ Salinity $^0_{00}$	P00480,	
☐ Tide Stage	P70211,	

CONDITION CODES

Parameter	Code	Result
☐ Weather Conditions	P00041,	
☐ Flow Severity	P01351,	
☐ ________ Severity	P013_ _,	
☐ ________ Severity	P013_ _,	

NUTRIENTS

LEVEL ☐ HIGH ☐ LOW

Parameter	Code	Result
☐ NO_2 - N	P00615,	
☐ NO_2 - NO_3 N	P00630,	
☐ NH_3 - N	P00610,	
☐ Tot Kjeldhal N	P00625,	
Ortho - PO_4 as P / PO_4	☐ P671, ☐ P660,	
Phosphorus tot as P / PO_4	☐ P665, ☐ P650,	

BACTERIOLOGICAL – DILUTIONS (REQUESTED)

Fecal Coliform / Total Coliform	10	1	10⁻¹	10⁻²	10⁻³	10⁻⁴	10⁻⁵	10⁻⁶
Fecal Streptococci	10	1	10⁻¹	10⁻²	10⁻³	10⁻⁴	10⁻⁵	10⁻⁶

Parameter	Code	Result
Fecal coli #100 ml ☐ MPN / ☐ MF	P31615, / P31613,	
☐ Fecal Strept MPN/100ml	P31677,	
☐ Tot coli MPN/100 ml	P31505,	

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) ________ SAMPLE

SEED YES ☐ NO ☐

CONC. %

BOD __

Parameter	Code	Result
☐ BOD	☐ 5-DAY P310, ☐ 6-DAY P312,	
COD ☐ Low Level / ☐ High Level	P335, / P340,	
☐ TOC	P00680,	
☐ Color Pt - Cou	P00080,	
☐ Turbidity	P00070,	
☐ Suspended Solids	P00530,	
☐ Suspended Solids fixed	P00540,	
☐ Tot. Solids	P00500,	
☐ Tot. Solids - fixed	P00510,	
☐ Tot. Dissolved Solids (TDS)	P70300,	

Parameter	Code	Result
☐ pH (LAB)	P00400,	
☐ Alkalinity as $CaCo_3$	P00410,	
☐ Min. Acidity as $CaCo_3$	P00436,	
☐ Chloride	P00940,	
☐ MBAS	P38260,	
☐ Phenols	P32730,	
☐ Hardness - tot as $CaCo_3$	P00900,	
☐ Sulfate	P00945,	
☐ Oil & Grease	P00556,	
☐ Petroleum Hydrocarbons	P45501,	
☐ Cyanide	P00720,	
☑ As - tot ug/l	P01002,	18
☑ Cd - tot ug/l	P01027,	1K
☐ Cr - tot ug/l	P01034,	
☐ Cu - tot ug/l	P01042,	
☐ Fe - tot ug/l	P01045,	
☑ Hg - tot ug/l	P71900,	.5K
☐ Mn - tot ug/l	P01055,	
☐ Ni - tot ug/l	P01067,	
☐ Pb - tot ug/l	P01051,	
☐ Zn - tot ug/l	P01092,	

ADDITIONAL ANALYSIS

Parameter	Code	Result
☐ ________	P________,	
☐ ________	P________,	
☐ ________	P________,	

RESULTS mg/L unless otherwise noted

CHAIN OF CUSTODY

Date	Time	From (Name)	To (Name)
			REPORT SUBMITTED
			JUN 4 1981
			NJDOH Environmental ...

...Review ________

Part 1 (White) - Water Quality Inventory Copy
Part 2 (Green) - Chemistry Copy
Part 3 (Pink) - Water Resources Copy (For Transmission)
Part 4 (Yellow) - Bacteriology Copy

ATTACHMENT J

EP- 009

STATE OF NEW JERSEY
RTMENT OF ENVIRONMENTAL PROTE
TRENTON, NEW JERSEY 08625

15

CHAIN OF CUSTODY RECORD

RECEIVED
MAY 8 1 05 PM '83

NAME OF UNIT AND ADDRESS: NJDEP WTR RSCES
1474 PROSPECT DIV. OF WATER RESOURCES
MS&E

204

SAMPLE NUMBER	Number of Containers	DESCRIPTION OF SAMPLES
	1	WM CLEARY WELL SAMPLING – METALS SS
09201	2	WELL No. 7 – METALS, SS
09202	2	WELL No. 6
09203	2	WELL No. 5
09204	2	WELL No. 3
09205	2	WELL No. 4
09206	2	WELL No. 1
09207	2	WELL No. 2

PERSON ASSUMING RESPONSIBILITY FOR SAMPLE: Charles Iversen

TIME	DATE
1630	83-04-13

SAMPLE NUMBER	RELINQUISHED BY:	RECEIVED BY:	TIME	DATE	REASON FOR CHANGE OF CUSTODY
All Above	Charles Iversen	Mike Dennis	10:34	4/14/83	DOH RECEIVING AREA
"					[redacted]
"	Mike Dennis	[illegible]	12:50	4/14/83	As
"	Mike Dennis	E. Halpern	11:00	4/19/83	Hg
"	Mike Dennis	[illegible]	8:45	4/18/83	Cd
"	Mike Dennis	Shirley Prather	2:30	4/15	Sus Solids
					REPORT SUBMITTED
					MAY 3 1983
					NJDOH Environmental Chemistry Laboratory

K

ATTACHMENT

DEP- 009

STATE OF NEW JERSEY
RTMENT OF ENVIRONMENTAL PROTE[illegible]
TRENTON, NEW JERSEY 08625

NJ 000 3816
WA Cleary

CHAIN OF CUSTODY RECORD

NAME OF UNIT AND ADDRESS: NJDEP WTR RSCES 204
1474 PROSPECT
BLANK No. I 42518

SAMPLE NUMBER	Number of Containers	DESCRIPTION OF SAMPLES
		WA Cleary Well Samples Pesticides, VOS
09201	5	Well No. 7 Pesticides VOS
09202	5	Well No. 6
09203	5	Well No. 5
09204	5	Well No. 3
09205	5	Well No. 4
09206	5	Well No 1
09207	5	Well No. 2

* (9202 - 1 of 4 VO's HAS AN AIR bubble)

PERSON ASSUMING RESPONSIBILITY FOR SAMPLE: Charles Iversen — TIME: 1630 — DATE: 83-04-13

SAMPLE NUMBER	RELINQUISHED BY:	RECEIVED BY:	TIME	DATE	REASON FOR CHANGE OF CUSTODY
All Above	Charles Iversen	[illegible]	10[illegible]	4/14/83	DOH PESTICIDE AREA
"	[illegible]	John Verfaillie	4:10	4/15/83	VO SCAN (551)
"	[illegible]	[illegible]	9:45	4/19/83	PEST. SCAN

REPORT SUBMITTED
MAY 3 1983
NJDOH Environmental Chemistry Laboratory

ATTACHMENT K

Form DEP-009
1/81

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
TRENTON, NEW JERSEY 08625

CHAIN OF CUSTODY RECORD

204

NAME OF UNIT AND ADDRESS: NJDEP WTR RSCES
1474 PROSPECT TRENTON

SAMPLE NUMBER	Number of Containers	DESCRIPTION OF SAMPLES
09180	1	SOIL
09181	1	VOs
09182	1	WACLEARY
09183	1	SELECTED SITES
09184	1	
09185	1	

PERSON ASSUMING RESPONSIBILITY FOR SAMPLE: Charles Iversen — TIME: 1500 — DATE: 83-05-31

SAMPLE NUMBER	RELINQUISHED BY:	RECEIVED BY:	TIME	DATE	REASON FOR CHANGE OF CUSTODY
All Above	C Iversen	Mike Kenna	10:03	6-1-83	DOH RECEIVING AREA -
"	Mike Kenna	[illegible]	9:42	6/3/83	VO SCAN (Soil)

REPORT SUBMITTED
JUN 14 1983
NJDOH Environmental Chemistry Laboratory

ATTACHMENT L

Form DEP-009
1/81

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
TRENTON, NEW JERSEY 08625

CHAIN OF CUSTODY RECORD 204

NAME OF UNIT AND ADDRESS: NJDEP WTR RSCES
1474 PROSPECT TRENTON

SAMPLE NUMBER	Number of Containers	DESCRIPTION OF SAMPLES C 15687 Std
09175	4	VO OLEARY DUG WELL
09176	4	VO " PRODUCTION WELL *
09177	3	VO " ABANDONED WELL +
09178	4	VO " BARRY WELL
09179	4	VO " CONTAMINATED LAGOON
		* 1 of 4 SAMPLE HAD AN AIR BUBBLE when DELIVERED TO D.O.H.
		+ ONLY HAD 3 VIALS IN SET.

RECEIVED JUN 17 11 35 AM '83 NJ DEPT ENV PROTECTION DIV WATER RESOURCES MSB

PERSON ASSUMING RESPONSIBILITY FOR SAMPLE:	TIME	DATE
Charles Iversen 83-05-31	1650	

SAMPLE NUMBER	RELINQUISHED BY:	RECEIVED BY:	TIME	DATE	REASON FOR CHANGE OF CUSTODY
All Above	C Iversen	Mike Dami	9:58	6-1-83	DOH [illegible] AREA
"	Mike Dami	John Verfaillie	11:45	6-2-83	VO SCAN
					REPORT SUBMITTED JUN 14 1983 NJDOH Environmental Chemistry Laboratory

ATTACHMENT L

Form VST-001
7/81

STATE OF NEW JERSEY
Department of Environmental Protection
Water Analysis

CHAIN OF CUSTODY

PLEASE TYPE OR PRINT WITH BALLPOINT PEN

BACT. LAB NO. _____
DATE REC'D. _____
BOTTLE NO. 09207
DATE REC'D. _____
STORET ENT. _____ READ _____

MUNICIPALITY FRANKLIN TWP	COUNTY SOMERSET	STREAM GW
FACILITY WA CLEARY	LOCATION RTE 27, FRANKLIN TWP	
REPRESENTATIVE EE	TITLE 204'	COLLECTED BY IVERSEN SAMSEL, ROTH
REMARKS WELL NO. 2 NR PERMITTED DISCHARGE STREAM		

Station Identification Number: SC. _____ . YR. MO. DAY: 83 04 13 HOUR: 1140 (1) Sample No.: P8. _____ .

FIELD ANALYSIS

- ☐ Water Temp. °C. (2) P00010,
- ☐ D.O. - Winkler (3) P00300,
- ☐ D.O. - Probe (4) P00299,
- ☐ pH (Field) (5) P00400,
- ☐ Sample Depth-ft. (6) P00003,
- ☐ Stream Flow-CFS (7) P00061,
- ☐ Gage Height-ft. (8) P00065,
- ☐ Spec. Cond. @ 25°C (9) P00095,
- ☐ Salinity °/00 (10) P00480,
- ☐ Tide Stage (11) P70211,

CONDITION CODES

- ☐ Weather Conditions (12) P00041,
- ☐ Flow Severity (13) P01351,
- ☐ _____ Severity (14) P013_ _,
- ☐ _____ Severity (15) P013_ _,

NUTRIENTS

LEVEL ☐ HIGH ☐ LOW

- ☐ NO_2 - N (16) P00615,
- ☐ $NO_2 + NO_3$ - N (17) P00630,
- ☐ NH_3 - N (18) P00610,
- ☐ Tot. Kjeldahl N (19) P00625,
- Ortho - PO_4 as P ☐ (20) P70507, ☐ PO_4 (21) P00660,
- Phosphorus-tot as P ☐ (22) P00665, ☐ PO_4 (23) P00650,

BACTERIOLOGICAL – DILUTIONS (REQUESTED)

	-1 10	1	-1 10	-2 10	-3 10	-4 10	-5 10	-6 10
Fecal Coliform / Total Coliform								
Fecal Streptococci								

- Fecal coli #100 ml ☐ MPN (24) P31615, ☐ MF (25) P31613,
- ☐ Fecal Strept MPN/100ml (26) P31677,
- ☐ Tot coli MPN/100 ml (27) P31505,

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) _____ SAMPLE _____

SEED YES ☐ NO ☐

CONC. % _____ BOD _____

- ☐ BOD 5-DAY (28) P310, 6-DAY (29) P312,
- ☐ COD (30) P340,
- ☐ TOC (31) P00680,
- ☐ Color Pt - Cou (32) P00080,
- ☐ Turbidity (33) P00076,
- ☒ Suspended Solids (34) P00530, 140
- ☐ Suspended Solids Ash (35) P00540,
- ☐ Tot. Solids (36) P00500,
- ☐ Tot. Solids - Ash (37) P00510,
- ☐ Tot. Dissolved Solids (TDS) (38) P70300,

- ☐ pH (LAB) (39) P00403,
- ☐ Alkalinity as $CaCO_3$ (40) P00410,
- ☐ Min. Acidity as $CaCO_3$ (41) P00436,
- ☐ Chloride (42) P00940,
- ☐ MBAS (43) P38260,
- ☐ Phenols (44) P32730,
- ☐ Hardness - tot as $CaCO_3$ (45) P00900,
- ☐ Sulfate (46) P00945,
- ☐ Oil & Grease (47) P00556,
- ☐ Petroleum Hydrocarbons (48) P45501,
- ☐ Cyanide (49) P00720,

- ☒ As - tot ug/l (50) P01002, 18
- ☒ Cd - tot ug/l (51) P01027, 4
- ☐ Cr - tot ug/l (52) P01034,
- ☐ Cu - tot ug/l (53) P01042,
- ☐ Fe - tot ug/l (54) P01045,
- ☒ Hg - tot ug/l (55) P71900, 1.0
- ☐ Mn - tot ug/l (56) P01055,
- ☐ Ni - tot ug/l (57) P01067,
- ☐ Pb - tot ug/l (58) P01051,
- ☐ Zn - tot ug/l (59) P01092,

ADDITIONAL ANALYSIS

- ☐ _____ P_____
- ☐ _____ P_____
- ☐ _____ P_____
- ☐ _____ P_____
- ☐ _____ P_____

RESULTS mg/l unless otherwise noted

REPORT SUBMITTED

MAY 3 1983

Chemist Review _____

NJDOH Environmental Chemistry Laboratory

Part 1 (White) - Water Quality Inventory Copy
Part 2 (Canary) - Laboratory Copy
Part 3 (Pink) - Laboratory Copy
Part 4 (Goldenrod) - Field Samplers Copy

ATTACHMENT K

Form VST-010
8/79

PLEASE TYPE OR PRINT
WITH BALLPOINT PEN

STATE OF NEW JERSEY
Department of Environmental Protection
Division of Water Resources
WATER ANALYSIS

CHAIN OF CUSTODY

BACT. LAB NO. _____
DATE REC'D. _____
BOTTLE NO. 09207
DATE REC'D. _____
STORET ENT. _____ READ _____

MUNICIPALITY: FRANKLIN TWP	COUNTY: SOMERSET	STREAM: GW
FACILITY: WA CLEARY	LOCATION: RTE 27 FRANKLIN TWP	
REPRESENTATIVE: E E	TITLE: 204	COLL NAME: IVERSEN, SAMSEL, ROTH
REMARKS: WELL No. 2		

STATION IDENTIFICATION NUMBER: SC, . | YR. MO. DAY: 830413 | HOUR: 1140

FIELD ANALYSIS

- ☐ Water Temp °C P10,
- ☐ D.O.-Winkler P300,
- ☐ D.O.-Probe P299,
- ☐ pH (Field) P400,
- ☐ Sample Depth-ft. P3,
- ☐ Gage Height-ft. P65,
- ☐ Spec. Cond. @ 25°C P95,
- ☐ Salinity °/00 P480,
- ☐ Tide Stage P70211,

BACTERIOLOGICAL - DILUTIONS (REQUESTED)

	10	1	-1 10	-2 10	-3 10	-4 10	-5 10	-6 10
Fecal Coliform / Total Coliform								
Fecal Streptococci								

Fecal coli /100 ml ☐ MPN P31615, ☐ MF P31613,

☐ Fecal Strept MPN /100 ml P31677,

☐ Tot coli MPN /100 ml P31505,

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) _____ SAMPLE

SEED YES ☐ NO ☐

CONC:% | BOD _____

☐ BOD ☐ 5-DAY P310, ☐ 6-DAY P312,

ANALYSIS	UNITS	PARAMETER	VALUE	RMKS.
☒ PESTICIDES	ppb	P	NONE DETECTED	
☒ VOs	ppb	P		
☐ AROMATIC HYDROCARBONS		P	1	K
☐ CHLORINATED "		P	1	K

DATE	TIME	CHAIN OF CUSTODY FROM (NAME)	(NAME)
			REPORT SUBMITTED
			MAY 3 1983
			NJDOH Environmental Chemistry Laboratory

Chemist Review _____

Part 1 - Water Quality Inventory Copy
Part 2 - Chemistry Copy
Part 3 - Water Resources Copy (For Transmission)
Part 4 - Bacteriology Copy

ATTACHMENT K

Form VST-001
7/81

STATE OF NEW JERSEY
Department of Environmental Protection
Water Analysis

CHAIN OF CUSTODY

PLEASE TYPE OR PRINT WITH BALLPOINT PEN

MUNICIPALITY: FRANKLIN TWP	COUNTY: SOMERSET	STREAM: GW	
FACILITY: WA CLEARY	LOCATION: RTE 27 FRANKLIN TWP		
REPRESENTATIVE: EE	TITLE: 204	COLL NAME: IVERSEN SAMSEL BOTH	
REMARKS: WELL NO. 1 NR. BENTONITE POND LAGOON			

BACT. LAB NO. _____
DATE REC'D. _____
BOTTLE NO. 09206
DATE REC'D. _____
STORET ENT. _____ READ _____

Station Identification Number: SC. _____ | YR. MO. DAY: 830413 | HOUR: 1235 (1) | Sample No.: P8. _____

FIELD ANALYSIS

- ☐ Water Temp. °C. (2) P00010,
- ☐ D.O. - Winkler (3) P00300,
- ☐ D.O. - Probe (4) P00299,
- ☐ pH (Field) (5) P00400,
- ☐ Sample Depth-ft. (6) P00003,
- ☐ Stream Flow-CFS (7) P00061,
- ☐ Gage Height-ft. (8) P00065,
- ☐ Spec. Cond. @ 25°C (9) P00095,
- ☐ Salinity °/00 (10) P00480,
- ☐ Tide Stage (11) P70211,

CONDITION CODES

- ☐ Weather Conditions (12) P00041,
- ☐ Flow Severity (13) P01351,
- ☐ _____ Severity (14) P013_ _,
- ☐ _____ Severity (15) P013_ _,

NUTRIENTS

LEVEL ☐ HIGH ☐ LOW

- ☐ NO_2 - N (16) P00615,
- ☐ $NO_2 + NO_3$ - N (17) P00630,
- ☐ NH_3 - N (18) P00610,
- ☐ Tot. Kjeldahl N (19) P00625,
- Ortho - PO_4 as P ☐ (20) P70507, ☐ (21) P00660,
- Phosphorus - tot as P PO_4 ☐ (22) P00665, ☐ (23) P00650,

BACTERIOLOGICAL – DILUTIONS (REQUESTED)

	10	1	-1 10	-2 10	-3 10	-4 10	-5 10	-6 10
Fecal Coliform / Total Coliform								
Fecal Streptococci								

- Fecal coli #100 ml ☐ MPN (24) P31615, ☐ MF (25) P31613,
- ☐ Fecal Strept MPN/100ml (26) P31677,
- ☐ Tot coli MPN/100 ml (27) P31505,

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) _____ SAMPLE

SEED YES ☐ NO ☐

CONC. %			
BOD _			

- ☐ BOD 5-DAY (28) P310, 6-DAY (29) P312,
- ☐ COD (30) P340,
- ☐ TOC (31) P00680,

- ☐ Color Pt - Cou (32) P00080,
- ☐ Turbidity (33) P00076,
- ☒ Suspended Solids (34) P00530, 1370
- ☐ Suspended Solids Ash (35) P00540,
- ☐ Tot. Solids (36) P00500,
- ☐ Tot. Solids - Ash (37) P00510,
- ☐ Tot. Dissolved Solids (TDS) (38) P70300,

- ☐ pH (LAB) (39) P00403,
- ☐ Alkalinity as $CaCO_3$ (40) P00410,
- ☐ Min. Acidity as $CaCO_3$ (41) P00436,
- ☐ Chloride (42) P00940,
- ☐ MBAS (43) P38260,
- ☐ Phenols (44) P32730,
- ☐ Hardness - tot as $CaCO_3$ (45) P00900,
- ☐ Sulfate (46) P00945,
- ☐ Oil & Grease (47) P00556,
- ☐ Petroleum Hydrocarbons (48) P45501,
- ☐ Cyanide (49) P00720,

- ☒ As - tot ug/l (50) P01002, 29
- ☒ Cd - tot ug/l (51) P01027, 1 1
- ☐ Cr - tot ug/l (52) P01034,
- ☐ Cu - tot ug/l (53) P01042,
- ☐ Fe - tot ug/l (54) P01045,
- ☒ Hg - tot ug/l (55) P71900, 0.5
- ☐ Mn - tot ug/l (56) P01055,
- ☐ Ni - tot ug/l (57) P01067,
- ☐ Pb - tot ug/l (58) P01051,
- ☐ Zn - tot ug/l (59) P01092,

ADDITIONAL ANALYSIS

- ☐ _____ P_____
- ☐ _____ P_____
- ☐ _____ P_____
- ☐ _____ P_____
- ☐ _____ P_____

RESULTS mg/l unless otherwise noted

REPORT SUBMITTED

Chemist Review _____ MAY 3 1983

Part 1 (White) - Water Quality Inventory Copy
Part 2 (Canary) - Laboratory Copy
Part 3 (Pink) - Laboratory Copy
Part 4 (Goldenrod) - Field Samplers Copy

NJDOH Environmental Chemistry Laboratory
ATTACHMENT K

Form VST-010
8/79

PLEASE TYPE OR PRINT
WITH BALLPOINT PEN

STATE OF NEW JERSEY
Department of Environmental Protection
Division of Water Resources
WATER ANALYSIS

CHAIN OF CUSTODY

BACT. LAB NO. _____
DATE REC'D. _____
BOTTLE NO. 09206
DATE REC'D. _____
STORET ENT. _____
READ _____

MUNICIPALITY: FRANKLIN TWP
COUNTY: SOMERSET
STREAM: GW
FACILITY: W A CLEARY
LOCATION: RTE 27 FRANKLIN TWP
REPRESENTATIVE: EE
TITLE: 204
COLL. NAME: IVERSEN, SAMSEL, ROTH
REMARKS: WELL NO. 1

STATION IDENTIFICATION NUMBER: SC, _____
YR. MO. DAY: 830413
HOUR: 1235

FIELD ANALYSIS

☐ Water Temp °C	P10,	
☐ D.O.-Winkler	P300,	
☐ D.O.-Probe	P299,	
☐ pH (Field)	P400,	
☐ Sample Depth-ft.	P3,	
☐ Gage Height-ft.	P65,	
☐ Spec. Cond. @ 25°C	P95,	
☐ Salinity °/00	P480,	
☐ Tide Stage	P70211,	

BACTERIOLOGICAL - DILUTIONS (REQUESTED)

Fecal Coliform / Total Coliform	10	1	-1 10	-2 10	-3 10	-4 10	-5 10	-6 10
Fecal Streptococci	10	1	-1 10	-2 10	-3 10	-4 10	-5 10	-6 10

Fecal coli /100 ml ☐ MPN P31615, ☐ MF P31613, _____

☐ Fecal Strept MPN/100 ml P31677, _____

☐ Tot coli MPN/100 ml P31505, _____

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) _____ SAMPLE
SEED YES ☐ NO ☐

CONC. %			
BOD			

☐ BOD ☐ 5-DAY P310, ☐ 6-DAY P312, _____

ANALYSIS	UNITS	PARAMETER	VALUE	RMKS.
☒ PESTICIDES	ppb	P	NONE	
		P	DETECTED	
☒ VOs	ppb	P		
☐ METHYLENE CHLORIDE		P	4	
☐ CHLOROFORM		P	3	
☐ CARBON TETRACHLORIDE		P	12	
☐ BENZENE		P	14	
		P	REPORT SUBMITTED	

DATE	TIME	CHAIN OF CUSTODY FROM (NAME)	TO (NAME)
			MAY 3 1983
			NJDOH Environmental Chemistry Laboratory

Chemist Review _____

Part 1 - Water Quality Inventory Copy
Part 2 - Chemistry Copy
Part 3 - Water Resources Copy (For Transmissio
Part 4 - Bacteriology Copy

ATTACHMENT K

Form VST-001
7/81

STATE OF NEW JERSEY
Department of Environmental Protection
Water Analysis

CHAIN OF CUSTODY

PLEASE TYPE OR PRINT WITH BALLPOINT PEN

BACT. LAB NO. _____
DATE REC'D. _____
BOTTLE NO. 09204
DATE REC'D. _____
STORET ENT. _____ READ _____

MUNICIPALITY FRANKLIN TWP	COUNTY SOMERSET	STREAM GW
FACILITY W A CLEARY	LOCATION RTE 27 FRANKLIN TWP	
REPRESENTATIVE EE	TITLE 204	COLL. NAME IVERSEN SAMSEL ROTH
REMARKS WELL ~~#4~~ No. 3 LAGOON DOWNGRADIENT NEAREST TO BLDGS		

Station Identification Number: SC [ ] YR. MO. DAY: 83 04 13 HOUR: 1340 (1) Sample No.: PS [ ]

FIELD ANALYSIS

- ☐ Water Temp. °C. (2) P00010,
- ☐ D.O. - Winkler (3) P00300,
- ☐ D.O. - Probe (4) P00299,
- ☐ pH (Field) (5) P00400,
- ☐ Sample Depth-ft. (6) P00003,
- ☐ Stream Flow-CFS (7) P00061,
- ☐ Gage Height-ft. (8) P00065,
- ☐ Spec. Cond. @ 25°C (9) P00095,
- ☐ Salinity °/00 (10) P00480,
- ☐ Tide Stage (11) P70211,

CONDITION CODES

- ☐ Weather Conditions (12) P00041,
- ☐ Flow Severity (13) P01351,
- ☐ _____ Severity (14) P013__,
- ☐ _____ Severity (15) P013__,

NUTRIENTS

LEVEL ☐ HIGH ☐ LOW

- ☐ NO_2 - N (16) P00615,
- ☐ $NO_2 + NO_3$ - N (17) P00630,
- ☐ NH_3 - N (18) P00610,
- ☐ Tot. Kjeldahl N (19) P00625,
- Ortho - PO_4 as P ☐ (20) P70507, ☐ (21) P00660,
- Phosphorus-tot as P PO_4 ☐ (22) P00665, ☐ (23) P00650,

BACTERIOLOGICAL – DILUTIONS (REQUESTED)

	10	1	-1 10	-2 10	-3 10	-4 10	-5 10	-6 10
Fecal Coliform								
Total Coliform								
Fecal Streptococci								

- Fecal coli #100 ml ☐ MPN (24) P31615, ☐ MF (25) P31613,
- ☐ Fecal Strept MPN/100ml (26) P31677,
- ☐ Tot coli MPN/100 ml (27) P31505,

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.)_____ SAMPLE

SEED YES ☐ NO ☐

CONC. % | BOD_

- ☐ BOD 5-DAY (28) P310, 6-DAY (29) P312,
- ☐ COD (30) P340,
- ☐ TOC (31) P00680,
- ☐ Color Pt - Cou (32) P00080,
- ☐ Turbidity (33) P00076,
- ☒ Suspended Solids (34) P00530, 2965
- ☐ Suspended Solids Ash (35) P00540,
- ☐ Tot. Solids (36) P00500,
- ☐ Tot. Solids - Ash (37) P00510,
- ☐ Tot. Dissolved Solids (TDS) (38) P70300,

- ☐ pH (LAB) (39) P00403,
- ☐ Alkalinity as $CaCO_3$ (40) P00410,
- ☐ Min. Acidity as $CaCO_3$ (41) P00436,
- ☐ Chloride (42) P00940,
- ☐ MBAS (43) P38260,
- ☐ Phenols (44) P32730,
- ☐ Hardness - tot as $CaCO_3$ (45) P00900,
- ☐ Sulfate (46) P00945,
- ☐ Oil & Grease (47) P00556,
- ☐ Petroleum Hydrocarbons (48) P45501,
- ☐ Cyanide (49) P00720,

- ☒ As - tot ug/l (50) P01002, 391
- ☒ Cd - tot ug/l (51) P01027, 72
- ☐ Cr - tot ug/l (52) P01034,
- ☐ Cu - tot ug/l (53) P01042,
- ☐ Fe - tot ug/l (54) P01045,
- ☒ Hg - tot ug/l (55) P71900, 11.0
- ☐ Mn - tot ug/l (56) P01055,
- ☐ Ni - tot ug/l (57) P01067,
- ☐ Pb - tot ug/l (58) P01051,
- ☐ Zn - tot ug/l (59) P01092,

ADDITIONAL ANALYSIS

- ☐ _____ P_____,
- ☐ _____ P_____,
- ☐ _____ P_____,
- ☐ _____ P_____,
- ☐ _____ P_____,

RESULTS mg/l unless otherwise noted

REPORT SUBMITTED

Chemist Review _____ MAY 3 1983

Part 1 (White) - Water Quality Inventory Copy
Part 2 (Canary) - Laboratory Copy
Part 3 (Pink) - Laboratory Copy
Part 4 (Goldenrod) - Field Samplers Copy

NJDOH Environmental Chemistry Laboratory

ATTACHMENT K

Form VST-001
7/81

STATE OF NEW JERSEY
Department of Environmental Protection
Water Analysis

CHAIN OF CUSTODY

PLEASE TYPE OR PRINT WITH BALLPOINT PEN

MUNICIPALITY: FRANKLIN TWP	COUNTY: SOMERSET	STREAM: GW
FACILITY: NA CLEARY	LOCATION: RTE 27 FRANKLIN TWP	
REPRESENTATIVE: E	TITLE: 204 COLL NAME: IVERSEN SAMSEL, ROTH	
REMARKS: WELL No. 5 LAGOON UPGRADIENT		

BACT. LAB NO. _____
DATE REC'D. _____
BOTTLE NO. 09203
DATE REC'D. _____
STORET ENT. _____ READ _____

Station Identification Number: SC. _____ YR. MO. DAY: 830413 HOUR: 1530 (1) Sample No.: PS. _____

FIELD ANALYSIS

- ☐ Water Temp. °C. (2) P00010,
- ☐ D.O. - Winkler (3) P00300,
- ☐ D.O. - Probe (4) P00299,
- ☐ pH (Field) (5) P00400,
- ☐ Sample Depth-ft. (6) P00003,
- ☐ Stream Flow-CFS (7) P00061,
- ☐ Gage Height-ft. (8) P00065,
- ☐ Spec. Cond. @ 25°C (9) P00095,
- ☐ Salinity °/00 (10) P00480,
- ☐ Tide Stage (11) P70211,

CONDITION CODES

- ☐ Weather Conditions (12) P00041,
- ☐ Flow Severity (13) P01351,
- ☐ _____ Severity (14) P013__,
- ☐ _____ Severity (15) P013__,

NUTRIENTS

LEVEL ☐ HIGH ☐ LOW

- ☐ NO_2 - N (16) P00615,
- ☐ $NO_2 + NO_3$ - N (17) P00630,
- ☐ NH_3 - N (18) P00610,
- ☐ Tot. Kjeldahl N (19) P00625,
- Ortho - PO_4 as P ☐ (20) P70507, ☐ (21) P00660,
- Phosphorus - tot as P ☐ (22) P00665, ☐ (23) P00650,

BACTERIOLOGICAL – DILUTIONS (REQUESTED)

	10	1	-1 10	-2 10	-3 10	-4 10	-5 10	-6 10
Fecal Coliform								
Total Coliform								
Fecal Streptococci								

- Fecal coli #100 ml ☐ MPN (24) P31615, ☐ MF (25) P31613,
- ☐ Fecal Strept MPN/100ml (26) P31677,
- ☐ Tot coli MPN/100 ml (27) P31505,

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) _____ SAMPLE

SEED YES ☐ NO ☐

CONC. % | BOD _____

- ☐ BOD 5-DAY (28) P310, 6-DAY (29) P312,
- ☐ COD (30) P340,
- ☐ TOC (31) P00680,
- ☐ Color Pt - Cou (32) P00080,
- ☐ Turbidity (33) P00076,
- ☒ Suspended Solids (34) P00530, 546
- ☐ Suspended Solids Ash (35) P00540,
- ☐ Tot. Solids (36) P00500,
- ☐ Tot. Solids - Ash (37) P00510,
- ☐ Tot. Dissolved Solids (TDS) (38) P70300,

- ☐ pH (LAB) (39) P00403,
- ☐ Alkalinity as $CaCO_3$ (40) P00410,
- ☐ Min. Acidity as $CaCO_3$ (41) P00436,
- ☐ Chloride (42) P00940,
- ☐ MBAS (43) P38260,
- ☐ Phenols (44) P32730,
- ☐ Hardness - tot as $CaCO_3$ (45) P00900,
- ☐ Sulfate (46) P00945,
- ☐ Oil & Grease (47) P00556,
- ☐ Petroleum Hydrocarbons (48) P45501,
- ☐ Cyanide (49) P00720,

- ☒ As - tot ug/l (50) P01002, 3215
- ☒ Cd - tot ug/l (51) P01027, 161
- ☐ Cr - tot ug/l (52) P01034,
- ☐ Cu - tot ug/l (53) P01042,
- ☐ Fe - tot ug/l (54) P01045,
- ☒ Hg - tot ug/l (55) P71900, 3.2
- ☐ Mn - tot ug/l (56) P01055,
- ☐ Ni - tot ug/l (57) P01067,
- ☐ Pb - tot ug/l (58) P01051,
- ☐ Zn - tot ug/l (59) P01092,

ADDITIONAL ANALYSIS

- ☐ _____ P_____
- ☐ _____ P_____
- ☐ _____ P_____
- ☐ _____ P_____
- ☐ _____ P_____

REPORT SUBMITTED

MAY 3 1983

RESULTS mg/l unless otherwise noted

Chemist Review _____

NJDOH Environmental Chemistry Laboratory

Part 1 (White) - Water Quality Inventory Copy
Part 2 (Canary) - Laboratory Copy
Part 3 (Pink) - Laboratory Copy
Part 4 (Goldenrod) - Field Samplers Copy

ATTACHMENT K

Form VST-001
7/81

STATE OF NEW JERSEY
Department of Environmental Protection
Water Analysis

PLEASE TYPE OR PRINT WITH BALLPOINT PEN

BACT. LAB NO. _____
DATE REC'D. _____
BOTTLE NO. 09205
DATE REC'D. _____
STORET ENT. _____ READ _____

MUNICIPALITY FRANKLIN TWP	COUNTY SOMERSET	STREAM GW
FACILITY W A CLEARY	LOCATION RTE 27 FRANKLIN TWP	
REPRESENTATIVE EE	TITLE 204 IVERSEN COL NAME SAMSEL, ROTH	
REMARKS WELL NO. 4 LAGOON DOWNGRADIENT FURTHEST FROM BLDGS		

Station Identification Number: SC. _____ . | YR. MO. DAY: 830413 | HOUR: 1445 (1) | Sample No.: P8. _____ .

FIELD ANALYSIS

- ☐ Water Temp. °C (2) P00010,
- ☐ D.O. - Winkler (3) P00300,
- ☐ D.O. - Probe (4) P00299,
- ☐ pH (Field) (5) P00400,
- ☐ Sample Depth-ft. (6) P00003,
- ☐ Stream Flow-CFS (7) P00061,
- ☐ Gage Height-ft. (8) P00065,
- ☐ Spec. Cond. @ 25°C (9) P00095,
- ☐ Salinity °/00 (10) P00480,
- ☐ Tide Stage (11) P70211,

CONDITION CODES

- ☐ Weather Conditions (12) P00041,
- ☐ Flow Severity (13) P01351,
- ☐ _____ Severity (14) P013__,
- ☐ _____ Severity (15) P013__,

NUTRIENTS

LEVEL ☐ HIGH ☐ LOW

- ☐ NO_2 - N (16) P00615,
- ☐ $NO_2 + NO_3$ - N (17) P00630,
- ☐ NH_3 - N (18) P00610,
- ☐ Tot. Kjeldahl N (19) P00625,
- Ortho - PO_4 as P ☐ (20) P70507, PO_4 ☐ (21) P00660,
- Phosphorus - tot as P ☐ (22) P00665, PO_4 ☐ (23) P00650,

BACTERIOLOGICAL – DILUTIONS (REQUESTED)

	10	1	−1 10	−2 10	−3 10	−4 10	−5 10	−6 10
Fecal Coliform / Total Coliform								
Fecal Streptococci								

- Fecal coli #/100 ml ☐ MPN (24) P31615, ☐ MF (25) P31613,
- ☐ Fecal Strept MPN/100ml (26) P31677,
- ☐ Tot coli MPN/100 ml (27) P31505,

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) _____ SAMPLE

SEED YES ☐ NO ☐

CONC. % _____ BOD _____

- ☐ BOD 5-DAY (28) P310, 6-DAY (29) P312,
- ☐ COD (30) P340,
- ☐ TOC (31) P00680,
- ☐ Color Pt - Cou (32) P00080,
- ☐ Turbidity (33) P00076,
- ☒ Suspended Solids (34) P00530, 224
- ☐ Suspended Solids Ash (35) P00540,
- ☐ Tot. Solids (36) P00500,
- ☐ Tot. Solids - Ash (37) P00510,
- ☐ Tot. Dissolved Solids (TDS) (38) P70300,

- ☐ pH (LAB) (39) P00403,
- ☐ Alkalinity as $CaCO_3$ (40) P00410,
- ☐ Min. Acidity as $CaCO_3$ (41) P00436,
- ☐ Chloride (42) P00940,
- ☐ MBAS (43) P38260,
- ☐ Phenols (44) P32730,
- ☐ Hardness - tot as $CaCO_3$ (45) P00900,
- ☐ Sulfate (46) P00945,
- ☐ Oil & Grease (47) P00556,
- ☐ Petroleum Hydrocarbons (48) P45501,
- ☐ Cyanide (49) P00720,

- ☒ As - tot ug/l (50) P01002, 140
- ☒ Cd - tot ug/l (51) P01027, 21
- ☐ Cr - tot ug/l (52) P01034,
- ☐ Cu - tot ug/l (53) P01042,
- ☐ Fe - tot ug/l (54) P01045,
- ☒ Hg - tot ug/l (55) P71900, 4.8
- ☐ Mn - tot ug/l (56) P01055,
- ☐ Ni - tot ug/l (57) P01067,
- ☐ Pb - tot ug/l (58) P01051,
- ☐ Zn - tot ug/l (59) P01092,

ADDITIONAL ANALYSIS

- ☐ _____ P _____
- ☐ _____ P _____
- ☐ _____ P _____
- ☐ _____ P _____
- ☐ _____ P _____

RESULTS mg/l unless otherwise noted

REPORT SUBMITTED

Chemist Review _____ MAY 3 1983

Part 1 (White) - Water Quality Inventory Copy
Part 2 (Canary) - Laboratory Copy
Part 3 (Pink) - Laboratory Copy
Part 4 (Goldenrod) - Field Laboratory Copy

NJDOH Environmental Chemistry Laboratory

ATTACHMENT K

Form VST-010
8/79

PLEASE TYPE OR PRINT
WITH BALLPOINT PEN

STATE OF NEW JERSEY
Department of Environmental Protection
Division of Water Resources
WATER ANALYSIS

CHAIN OF CUSTODY

BACT. LAB NO.
DATE REC'D.
BOTTLE NO. 09204
DATE REC'D.
STORET ENT.
READ

MUNICIPALITY FRANKLIN TWP	COUNTY SOMERSET	STREAM GW
FACILITY WA CLEARY	LOCATION RTE 27 FRANKLIN TWP	
REPRESENTATIVE EE	TITLE 204	COLL NAME IVERSEN, SAMSEL, ROTH
REMARKS WELL No. 3		

STATION IDENTIFICATION NUMBER: SC,

YR. MO. DAY: 830413

HOUR: 1340

FIELD ANALYSIS

- ☐ Water Temp °C P10,
- ☐ D.O.-Winkler P300,
- ☐ D.O.-Probe P299,
- ☐ pH (Field) P400,
- ☐ Sample Depth-ft. P3,
- ☐ Gage Height-ft. P65,
- ☐ Spec. Cond. @ 25°C P95,
- ☐ Salinity °/00 P480,
- ☐ Tide Stage P70211,

BACTERIOLOGICAL - DILUTIONS (REQUESTED)

	10	1	-1 10	-2 10	-3 10	-4 10	-5 10	-6 10
Fecal Coliform / Total Coliform								
Fecal Streptococci								

Fecal coli /100 ml ☐ MPN P31615, ☐ MF P31613,

☐ Fecal Strept MPN /100 ml P31677,

☐ Tot coli MPN /100 ml P31505,

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) _____ SAMPLE

SEED YES ☐ NO ☐

CONC.%

BOD

☐ BOD ☐ 5-DAY P310, ☐ 6-DAY P312,

ANALYSIS	UNITS	PARAMETER	VALUE	RMKS
☒ PESTICIDES	ppb	P	NONE	
☐		P	DETECTED	
☐ VO SCAN	ppb	P		
☐		P		
☐ METHYLENE CHLORIDE		P	36	
☐ CHLOROFORM		P	18000	
☐ CARBON TETRACHLORIDE		P	93000	
☐ TETRACHLOROETHYLENE		P	210	
☐ BENZENE		P	760	
☐ TOLUENE		P	70	
☐ ETHYLBENZENE		P	35	
☐ p-XYLENE		P	34	
☐ O-XYLENE		P	53	
☒ VOS	ppb	P		
☐		P		
☐ M-XYLENE		P	100	
☐ Tert-butyl BENZENE		P	8	
☐ BROMOBENZENE		P	230	
☐ 1,3,5 TRIMETHYLBENZENE		P	9	
☐ 1,2,4 TRIMETHYLBENZENE		P	160	
☐ 2,3 BENZOFURAN		P	110	
☐ cyclopropylbenzene		P	62	
☐		P		
☐ + 1 unidentified peak		P		
☐		P		

DATE	TIME	CHAIN OF CUSTODY FROM (NAME)	TO (NAME)
			REPORT SUBMITTED
			MAY 3 1983
			NJDOH Environmental Chemistry Laboratory

Chemist Review _____

Part 1 - Water Quality Inventory Copy
Part 2 - Chemistry Copy
Part 3 - Water Resources Copy (For Transmissio
Part 4 - Bacteriology Copy

ATTACHMENT K

Form VST-010
8/79

PLEASE TYPE OR PRINT
WITH BALLPOINT PEN

STATE OF NEW JERSEY
Department of Environmental Protection
Division of Water Resources
WATER ANALYSIS

CHAIN OF CUSTODY

MUNICIPALITY: FRANKLIN TWP	COUNTY: SOMERSET	STREAM: GW	
FACILITY: W A CLEARY	LOCATION: RTE 27 FRANKLIN TWP		
REPRESENTATIVE: E E	TITLE: 204	COLL NAME: IVERSEN, SAMSEL, ROTH	
REMARKS: WELL No. 4			

BACT. LAB NO.
DATE REC'D.
BOTTLE NO. 09205
DATE REC'D.
STORET ENT.
READ

STATION IDENTIFICATION NUMBER: SC,
YR. MO. DAY: 83 04 13
HOUR: 1445

FIELD ANALYSIS

- ☐ Water Temp °C P10,
- ☐ D.O.-Winkler P300,
- ☐ D.O.-Probe P299,
- ☐ pH (Field) P400,
- ☐ Sample Depth-ft. P3,
- ☐ Gage Height-ft. P65,
- ☐ Spec. Cond. @ 25°C P95,
- ☐ Salinity °/00 P480,
- ☐ Tide Stage P70211,

BACTERIOLOGICAL - DILUTIONS (REQUESTED)

Fecal Coliform / Total Coliform	10	1	-1 10	-2 10	-3 10	-4 10	-5 10	-6 10
Fecal Streptococci	10	1	-1 10	-2 10	-3 10	-4 10	-5 10	-6 10

Fecal coli /100 ml ☐ MPN P31615, ☐ MF P31613,

☐ Fecal Strept MPN /100 ml P31677,

☐ Tot coli MPN /100 ml P31505,

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) _____ SAMPLE
SEED YES ☐ NO ☐

CONC.%			
BOD			

☐ BOD ☐ 5-DAY P310, ☐ 6-DAY P312,

ANALYSIS	UNITS	PARAMETER	VALUE	RMKS.
☒ PESTICIDES	ppb			
☐				
☐ chlordane		P	1.13	
☐		P		
☐		P		
☐		P		
☐		P		
☐		P		
☐		P		
☐		P		
☐		P		
☐		P		
☐		P		
☐		P		
☒ VOC	ppb	P		
☐		P		
☐ CHLOROFORM		P	9	
☐ CARBON TETRACHLORIDE		P	110	
☐ BENZENE		P	46	
☐ 2,3 BENZOFURAN		P	6	
☐ NAPHTHALENE		P	4	
☐		P		
☐		P		
☐		P		
☐		P		
☐		P		
☐		P		
☐		P		

DATE	TIME	CHAIN OF CUSTODY FROM (NAME)	(DATE)
			REPORT SUBMITTED
			MAY 3 1983
			NJDOH Environmental Chemistry Laboratory

Chemist Review _____

Part 1 - Water Quality Inventory Copy
Part 2 - Chemistry Copy
Part 3 - Water Resources Copy (For Transmission)
Part 4 - Bacteriology Copy

ATTACHMENT K

Form VST-010
8/79

PLEASE TYPE OR PRINT
WITH BALLPOINT PEN

STATE OF NEW JERSEY
Department of Environmental Protection
Division of Water Resources
WATER ANALYSIS

CHAIN OF CUSTODY

BACT. LAB NO.
DATE REC'D.
BOTTLE NO. 09203
DATE REC'D.
STORET ENT. READ

MUNICIPALITY FRANKLIN TWP	COUNTY SOMERSET	STREAM GW	
FACILITY WA CLEARY	LOCATION RTE 27, FRANKLIN TWP		
REPRESENTATIVE EE	TITLE 204'	COLL NAME IVERSEN, SAMSEL, ROTH	
REMARKS WELL No. 5			

STATION IDENTIFICATION NUMBER: SC, [redacted] YR. MO. DAY: 83 04 13 HOUR: 1530

FIELD ANALYSIS

☐ Water Temp °C	P10,	
☐ D.O.-Winkler	P300,	
☐ D.O.-Probe	P299,	
☐ pH (Field)	P400,	
☐ Sample Depth-ft.	P3,	
☐ Gage Height-ft.	P65,	
☐ Spec. Cond. @ 25°C	P95,	
☐ Salinity °/00	P480,	
☐ Tide Stage	P70211,	

BACTERIOLOGICAL - DILUTIONS (REQUESTED)

Fecal Coliform / Total Coliform	10	1	-1 10	-2 10	-3 10	-4 10	-5 10	-6 10
Fecal Streptococci	10	1	-1 10	-2 10	-3 10	-4 10	-5 10	-6 10

Fecal coli /100 ml: ☐ MPN P31615, ☐ MF P31613, [ ]

☐ Fecal Strept MPN /100 ml P31677, [ ]

☐ Tot coli MPN /100 ml P31505, [ ]

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) _____ SAMPLE
SEED YES ☐ NO ☐

CONC. %			
BOD			

☐ BOD ☐ 5-DAY P310, ☐ 6-DAY P312, [ ]

ANALYSIS	UNITS	PARAMETER	VALUE	RMKS.
X PESTICIDES	ppb	P		
☐ CHLORDANE		P	2.11	
☐		P		
☐ VO SCAN	ppb	P		
☐ 1,1 dichloroethane		P	16	
☐ chloroform		P	6	
☐ carbon tetrachloride		P	70	
☐ 1,1,2,2 tetrachloroethane		P	3	
☐ BENZENE		P	3100	
☐ TOLUENE		P	4	
☐ ETHYLBENZENE		P	22	
☐ p-XYLENE		P	9	
☐ o-XYLENE		P	13	
X VOS	ppb	P		
☐ M-XYLENE		P	10	
☐ CUMENE		P	9	
☐ N-PROPYLBENZENE		P	19	
☐ TERT-butylbenzene		P	27	
☐ 1,3,5 TRIMETHYLBENZENE		P	47	
☐ 1,2,4 TRIMETHYLBENZENE		P	130	
☐ 2,3 BENZOFURAN		P	37	
☐ HEXACHLOROBUTADIENE		P	30	
☐ NAPHTHALENE		P	11	
☐ cyclopropylbenzene		P	65	
☐ + 7 UNIDENTIFIED PEAKS		P		

DATE	TIME	CHAIN OF CUSTODY FROM (NAME)	TO (NAME)
			REPORT SUBMITTED
			MAY 3 1983
			NJDOH Environmental Chemistry Laboratory

Chemist Review _____

Part 1 - Water Quality Inventory Copy
Part 2 - Chemistry Copy
Part 3 - Water Resources Copy (For Transmissio
Part 4 - Bacteriology Copy

ATTACHMENT K

Form VST-001
7/81

STATE OF NEW JERSEY
Department of Environmental Protection
Water Analysis

CHAIN OF

PLEASE TYPE OR PRINT WITH BALLPOINT PEN

BACT. LAB NO. _____
DATE REC'D. _____
BOTTLE NO. 09202
DATE REC'D. _____
STORET ENT. _____ READ _____

MUNICIPALITY FRANKLIN TWP	COUNTY SOMERSET	STREAM GW
FACILITY W A CLEARY	LOCATION RTE 27 FRANKLIN TWP	
REPRESENTATIVE EE	TITLE 2041	COLLECTOR IVERSEN, SAMSEL, ROTH
REMARKS WELL NO. 6 NR DOCUMENTED SOIL CONTAMINATION		

Station Identification Number: SC. _____ | YR. MO. DAY: 830413 | HOUR: 1630 (1) | Sample No.: P8. _____

FIELD ANALYSIS

- ☐ Water Temp. °C. (2) P00010,
- ☐ D.O. - Winkler (3) P00300,
- ☐ D.O. - Probe (4) P00299,
- ☐ pH (Field) (5) P00400,
- ☐ Sample Depth-ft. (6) P00003,
- ☐ Stream Flow-CFS (7) P00061,
- ☐ Gage Height-ft. (8) P00065,
- ☐ Spec. Cond. @ 25°C (9) P00095,
- ☐ Salinity °/00 (10) P00480,
- ☐ Tide Stage (11) P70211,

BACTERIOLOGICAL – DILUTIONS (REQUESTED)

	-10	1	-1 10	-2 10	-3 10	-4 10	-5 10	-6 10
Fecal Coliform / Total Coliform								
Fecal Streptococci								

- Fecal coli #100 ml ☐ MPN (24) P31615, ☐ MF (25) P31613,
- ☐ Fecal Strept MPN/100ml (26) P31677,
- ☐ Tot coli MPN/100 ml (27) P31505,

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) _____ SAMPLE

SEED YES ☐ NO ☐

CONC. % _____ BOD _____

- ☐ BOD 5-DAY (28) P310, 6-DAY (29) P312,
- ☐ COD (30) P340,
- ☐ TOC (31) P00680,

- ☐ Color Pt - Cou (32) P00080,
- ☐ Turbidity (33) P00076,
- ☒ Suspended Solids (34) P00530, 11525
- ☐ Suspended Solids Ash (35) P00540,
- ☐ Tot. Solids (36) P00500,
- ☐ Tot. Solids - Ash (37) P00510,
- ☐ Tot. Dissolved Solids (TDS) (38) P70300,

- ☐ pH (LAB) (39) P00403,
- ☐ Alkalinity as $CaCO_3$ (40) P00410,
- ☐ Min. Acidity as $CaCO_3$ (41) P00436,
- ☐ Chloride (42) P00940,
- ☐ MBAS (43) P38260,
- ☐ Phenols (44) P32730,
- ☐ Hardness - tot as $CaCO_3$ (45) P00900,
- ☐ Sulfate (46) P00945,
- ☐ Oil & Grease (47) P00556,
- ☐ Petroleum Hydrocarbons (48) P45501,
- ☐ Cyanide (49) P00720,

CONDITION CODES

- ☐ Weather Conditions (12) P00041,
- ☐ Flow Severity (13) P01351,
- ☐ _____ Severity (14) P013__,
- ☐ _____ Severity (15) P013__,

NUTRIENTS

LEVEL ☐ HIGH ☐ LOW

- ☐ NO_2 - N (16) P00615,
- ☐ $NO_2 + NO_3$ - N (17) P00630,
- ☐ NH_3 - N (18) P00610,
- ☐ Tot. Kjeldahl N (19) P00625,
- Ortho - PO_4 as P ☐ (20) P70507, PO_4 ☐ (21) P00660,
- Phosphorus - tot as P ☐ (22) P00665, PO_4 ☐ (23) P00650,

- ☒ As - tot ug/l (50) P01002, 114
- ☒ Cd - tot ug/l (51) P01027, 88
- ☐ Cr - tot ug/l (52) P01034,
- ☐ Cu - tot ug/l (53) P01042,
- ☐ Fe - tot ug/l (54) P01045,
- ☒ Hg - tot ug/l (55) P71900, 0.7
- ☐ Mn - tot ug/l (56) P01055,
- ☐ Ni - tot ug/l (57) P01067,
- ☐ Pb - tot ug/l (58) P01051,
- ☐ Zn - tot ug/l (59) P01092,

ADDITIONAL ANALYSIS

- ☐ _____ P_____,
- ☐ _____ P_____,
- ☐ _____ P_____,
- ☐ _____ P_____,
- ☐ _____ P_____,

REPORT SUBMITTED

RESULTS mg/l unless otherwise noted

Chemist Review MAY 3 1983

Part 1 (White) - Water Quality Inventory Copy
Part 2 (Canary) - Laboratory Copy
Part 3 (Pink) - Laboratory Copy
Part 4 (Goldenrod) - Field Services Copy

NJDEP Environmental Chemistry Laboratory

ATTACHMENT 1

Form VST-010
8/79

PLEASE TYPE OR PRINT
WITH BALLPOINT PEN

STATE OF NEW JERSEY
Department of Environmental Protection
Division of Water Resources
WATER ANALYSIS

CHAIN OF

BACT. LAB NO.
DATE REC'D.
BOTTLE NO. 09207
DATE REC'D.
STORET ENT.
READ

MUNICIPALITY: FRANKLIN TWP
COUNTY: SOMERSET
STREAM: GW
FACILITY: WACLEARY
LOCATION: RTE 27 FRANKLIN TWP
REPRESENTATIVE: E E
TITLE: 204
COLL NAME: IVERSEN, SAMSEL, ROTH
REMARKS: WELL No. 6

STATION IDENTIFICATION NUMBER: SC,
YR 83 MO. 04 DAY 13 HOUR 1630

FIELD ANALYSIS

☐ Water Temp °C	P10,	
☐ D.O.-Winkler	P300,	
☐ D.O.-Probe	P299,	
☐ pH (Field)	P400,	
☐ Sample Depth-ft.	P3,	
☐ Gage Height-ft.	P65,	
☐ Spec. Cond. @ 25°C	P95,	
☐ Salinity ‰	P480,	
☐ Tide Stage	P70211,	

BACTERIOLOGICAL - DILUTIONS (REQUESTED)

Fecal Coliform / Total Coliform	10	1	-1 10	-2 10	-3 10	-4 10	-5 10	-6 10
Fecal Streptococci	10	1	-1 10	-2 10	-3 10	-4 10	-5 10	-6 10

Fecal coli /100 ml: ☐ MPN P31615, ☐ MF P31613, [ ] *

☐ Fecal Strept MPN /100 ml P31677, [ ]

☐ Tot coli MPN /100 ml P31505, [ ]

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) _____ SAMPLE
SEED YES ☐ NO ☐

CONC. %			
BOD			

☐ BOD ☐ 5-DAY P310, ☐ 6-DAY P312, [ ]

ANALYSIS	UNITS	PARAMETER	VALUE	RMKS.
☒ PESTICIDES	ppb	P	NONE	
		P	DETECTED	
		P		
		P		
		P		
		P		
		P		
		P		
		P		
		P		
		P		
		P		
		P		
		P		
		P		
		P		
☒ VOS	ppb	P		
		P		
☐ chloroform		P	4	
☐ carbontetrachloride		P	26	
☐ benzene		P	36000	
☐ Toluene		P	3	
☐ o-xylene		P	4	
☐ hexachlorobutadiene		P	64	
☐ 1,2,4 trichlorobenzene		P	62	
☐ Naphthalene		P	2	
☐		P		
☐ + 1 unidentified peak		P		

* DATE 1 of 4 VO VIALS TIME HAD AN AIR BUBBLE

CHAIN OF CUSTODY FROM (NAME) INITIALS

REPORT SUBMITTED
MAY 3 1983
NJDOH Environmental Chemistry Laboratory

Chemist Review _____

Part 1 - Water Quality Inventory Copy
Part 2 - Chemistry Copy
Part 3 - Water Resources Copy (For Transmissio
Part 4 - Bacteriology Copy

ATTACHMENT A

Form VST-001
7/81

STATE OF NEW JERSEY
Department of Environmental Protection
Water Analysis

CHAIN OF CUSTODY

PLEASE TYPE OR PRINT WITH BALLPOINT PEN

MUNICIPALITY: FRANKLIN TWP	COUNTY: SOMERSET	STREAM: GW
FACILITY: WA CLEARY	LOCATION: RTE 27 FRANKLIN TWP	
REPRESENTATIVE: EF	TITLE: 204	COLL NAME: IVERSEN, SAMUEL ROTH
REMARKS: WELL No. 7 - UP GRADIENT?		

BACT. LAB NO. _____
DATE REC'D. _____
BOTTLE NO. 09201
DATE REC'D. _____
STORET ENT. _____ READ _____

Station Identification Number: S C . _____ .
YR. MO. DAY: 84 04 13
HOUR: 1015 (1)
Sample No.: P S . _____ .

FIELD ANALYSIS

- ☐ Water Temp. °C. (2) P00010,
- ☐ D.O. - Winkler (3) P00300,
- ☐ D.O. - Probe (4) P00299,
- ☐ pH (Field) (5) P00400,
- ☐ Sample Depth-ft. (6) P00003,
- ☐ Stream Flow-CFS (7) P00061,
- ☐ Gage Height-ft. (8) P00065,
- ☐ Spec. Cond. @ 25 °C (9) P00095,
- ☐ Salinity °/00 (10) P00480,
- ☐ Tide Stage (11) P70211,

CONDITION CODES

- ☐ Weather Conditions (12) P00041,
- ☐ Flow Severity (13) P01351,
- ☐ _____ Severity (14) P013__,
- ☐ _____ Severity (15) P013__,

NUTRIENTS

LEVEL ☐ HIGH ☐ LOW

- ☐ NO_2 - N (16) P00615,
- ☐ $NO_2 + NO_3$ - N (17) P00630,
- ☐ NH_3 - N (18) P00610,
- ☐ Tot. Kjeldahl N (19) P00625,
- ☐ Ortho - PO_4 as P (20) P70507, ☐ PO_4 (21) P00660,
- ☐ Phosphorus - tot as P (22) P00665, ☐ PO_4 (23) P00650,

BACTERIOLOGICAL – DILUTIONS (REQUESTED)

	10	1	-1 10	-2 10	-3 10	-4 10	-5 10	-6 10
Fecal Coliform								
Total Coliform								
Fecal Streptococci								

- Fecal coli #/100 ml ☐ MPN (24) P31615, ☐ MF (25) P31613,
- ☐ Fecal Strept MPN/100ml (26) P31677,
- ☐ Tot coli MPN/100 ml (27) P31505,

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) _____ SAMPLE

SEED YES ☐ NO ☐

CONC. % | BOD _

- ☐ BOD 5-DAY (28) P310, 6-DAY (29) P312,
- ☐ COD (30) P340,
- ☐ TOC (31) P00680,
- ☐ Color Pt - Cou (32) P00080,
- ☐ Turbidity (33) P00076,
- ☒ Suspended Solids (34) P00530, 264
- ☐ Suspended Solids Ash (35) P00540,
- ☐ Tot. Solids (36) P00500,
- ☐ Tot. Solids - Ash (37) P00510,
- ☐ Tot. Dissolved Solids (TDS) (38) P70300,

- ☐ pH (LAB) (39) P00403,
- ☐ Alkalinity as $CaCO_3$ (40) P00410,
- ☐ Min. Acidity as $CaCO_3$ (41) P00436,
- ☐ Chloride (42) P00940,
- ☐ MBAS (43) P38260,
- ☐ Phenols (44) P32730,
- ☐ Hardness - tot as $CaCO_3$ (45) P00900,
- ☐ Sulfate (46) P00945,
- ☐ Oil & Grease (47) P00556,
- ☐ Petroleum Hydrocarbons (48) P45501,
- ☐ Cyanide (49) P00720,

- ☒ As - tot ug/l (50) P01002, 54
- ☒ Cd - tot ug/l (51) P01027, 1
- ☐ Cr - tot ug/l (52) P01034,
- ☐ Cu - tot ug/l (53) P01042,
- ☐ Fe - tot ug/l (54) P01045,
- ☒ Hg - tot ug/l (55) P71900, 0.6
- ☐ Mn - tot ug/l (56) P01055,
- ☐ Ni - tot ug/l (57) P01067,
- ☐ Pb - tot ug/l (58) P01051,
- ☐ Zn - tot ug/l (59) P01092,

ADDITIONAL ANALYSIS

- ☐ _____ P_____
- ☐ _____ P_____
- ☐ _____ P_____
- ☐ _____ P_____
- ☐ _____ P_____

RESULTS mg/l unless otherwise noted

RT SUBMITTED

Chemist Review _____ MAY 3 1983

Part 1 (White) - Water Quality Inventory Copy
Part 2 (Canary) - Laboratory Copy
Part 3 (Pink) - Laboratory Copy
Part 4 (Goldenrod) - Field Samplers Copy

NIOSH Environmental Chemistry Laboratory

ATTACHMENT K

Form VST-010
8/79

PLEASE TYPE OR PRINT
WITH BALLPOINT PEN

STATE OF NEW JERSEY
Department of Environmental Protection
Division of Water Resources
WATER ANALYSIS

MUNICIPALITY: FRANKLIN TWP	COUNTY: SOMERSET	STREAM: GW	
FACILITY: WA CLEARY	LOCATION: RTE 27, FRANKLIN TWP		
REPRESENTATIVE: EE	TITLE: 2 of	COLL. NAME: IVERSEN, SAMSEL, ROTH	
REMARKS: WELL NO. 7			

BACT. LAB NO.
DATE REC'D.
BOTTLE NO. 09201
DATE REC'D.
STORET ENT.
READ

STATION IDENTIFICATION NUMBER: SC,
YR. MO. DAY: 830413
HOUR: 1015

FIELD ANALYSIS

☐ Water Temp °C	P10,	
☐ D.O.-Winkler	P300,	
☐ D.O.-Probe	P299,	
☐ pH (Field)	P400,	
☐ Sample Depth-ft.	P3,	
☐ Gage Height-ft.	P65,	
☐ Spec. Cond. @ 25°C	P95,	
☐ Salinity °/00	P480,	
☐ Tide Stage	P70211,	

BACTERIOLOGICAL - DILUTIONS (REQUESTED)

Fecal Coliform / Total Coliform	10	1	-1 10	-2 10	-3 10	-4 10	-5 10	-6 10
Fecal Streptococci	10	1	-1 10	-2 10	-3 10	-4 10	-5 10	-6 10

Fecal coli /100 ml ☐ MPN P31615, ☐ MF P31613,

☐ Fecal Strept MPN /100 ml P31677,

☐ Tot coli MPN /100 ml P31505,

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) _____ SAMPLE SEED YES ☐ NO ☐

CONC. %			
BOD			

☐ BOD ☐ 5-DAY P310, ☐ 6-DAY P312,

ANALYSIS	UNITS	PARAMETER	VALUE	RMKS.
☒ PESTICIDES	ppb	P	NONE	
☐		P	DETECTED	
☐		P		
☐		P		
☐		P		
☐		P		
☐		P		
☐		P		
☐		P		
☐		P		
☐		P		
☐		P		
☒ VOS	ppb	P		1
☐		P		
☐ BENZENE		P	19000	
☐ ETHYLBENZENE		P	7	
☐ p-XYLENE		P	3	
☐ N-PROPYLBENZENE		P	6	
☐ 1,3,5-TRIMETHYLBENZENE		P	5	
☐ 1,2,4 TRIMETHYLBENZENE		P	16	
☐ p-dichlorobenzene		P	19	
☐ NAPHTHALENE		P	2	
☐		P		
☐ + 1 unidentified peak		P		
☐		P		

DATE	TIME	CHAIN OF CUSTODY FROM (NAME)	REPORT TO SUBMITTED
			MAY 3 1983
			NJDOH Environmental Chemistry Laboratory

Chemist Review _____

Part 1 - Water Quality Inventory Copy
Part 2 - Chemistry Copy
Part 3 - Water Resources Copy (For Transmissio
Part 4 - Bacteriology Copy

ATTACHMENT K

Form DEP- 009
1/81

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
TRENTON, NEW JERSEY 08625

NJ[illegible] (struck through)

CHAIN OF CUSTODY RECORD 204

NAME OF UNIT AND ADDRESS: NJDEP WTR RSCES
1474 PROSPECT TRENTON 08625

SAMPLE NUMBER	Number of Containers	DESCRIPTION OF SAMPLES
09186	1	CLEARY ABANDONED WELL As, Cd, Hg
09187	1	" DUG WELL " " "

PERSON ASSUMING RESPONSIBILITY FOR SAMPLE:	TIME	DATE
Charles Iversen 83-05-31	1720	

SAMPLE NUMBER	RELINQUISHED BY:	RECEIVED BY:	TIME	DATE	REASON FOR CHANGE OF CUSTODY
All Above	Charles Iversen	Mike Dennis	10:05	6/83	DOH RECEIVING AREA
"	Mike Dennis	[illegible]	2:15	6/6/83	As
"	Mike Dennis	[illegible]	9:10	6/3/83	Cd.
"	Mike Dennis	I. Halperin	10:00	6/2/83	Hg

REPORT SUBMITTED
JUN 14 1983
NJDOH Environmental
Chemistry Laboratory

ATTACHMENT L

Form VST-001
7/81

STATE OF NEW JERSEY
Department of Environmental Protection
Water Analysis

PLEASE TYPE OR PRINT WITH BALLPOINT PEN

BACT. LAB NO. _____
DATE REC'D. _____
BOTTLE NO. 09187
DATE REC'D. _____
STORET ENT. _____ READ _____

MUNICIPALITY FRANKLIN TWP	COUNTY SOMERSET	STREAM GW
FACILITY WA CLEARY	LOCATION RTE 27	
REPRESENTATIVE EE	TITLE 204	COLL NAME IVERSEN-SAMSEL
REMARKS CLEARY DUG WELL		

Station Identification Number: SC, [ ]
YR. MO. DAY: 83 05 31
HOUR: 1720 (1)
Sample No.: P8, [ ]

FIELD ANALYSIS

- ☐ Water Temp. °C. (2) P00010,
- ☐ D.O. - Winkler (3) P00300,
- ☐ D.O. - Probe (4) P00299,
- ☐ pH (Field). (5) P00400,
- ☐ Sample Depth-ft. (6) P00003,
- ☐ Stream Flow-CFS (7) P00061,
- ☐ Gage Height-ft. (8) P00065,
- ☐ Spec. Cond. @ 25 °C (9) P00095,
- ☐ Salinity °/00 (10) P00480,
- ☐ Tide Stage (11) P70211,

CONDITION CODES

- ☐ Weather Conditions (12) P00041,
- ☐ Flow Severity (13) P01351,
- ☐ _____ Severity (14) P013__,
- ☐ _____ Severity (15) P013__,

NUTRIENTS

LEVEL ☐ HIGH ☐ LOW

- ☐ NO_2 - N (16) P00615,
- ☐ $NO_2 + NO_3$ - N (17) P00630,
- ☐ NH_3 - N (18) P00610,
- ☐ Tot. Kjeldahl N (19) P00625,
- Ortho - PO_4 as P ☐ (20) P70507, ☐ (21) P00660,
- Phosphorus-tot as PO_4 P ☐ (22) P00665, ☐ (23) P00650,

BACTERIOLOGICAL - DILUTIONS (REQUESTED)

	10	1	-1 10	-2 10	-3 10	-4 10	-5 10	-6 10
Fecal Coliform								
Total Coliform								
Fecal Streptococci								

- Fecal coli #100 ml ☐ MPN (24) P31615, ☐ MF (25) P31613,
- ☐ Fecal Strept MPN/100ml (26) P31677,
- ☐ Tot coli MPN/100 ml (27) P31505,

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) _____ SAMPLE
SEED YES ☐ NO ☐
CONC. % BOD__

- ☐ BOD 5-DAY (28) P310, 6-DAY (29) P312,
- ☐ COD (30) P340,
- ☐ TOC (31) P00680,
- ☐ Color Pt - Cou (32) P00080,
- ☐ Turbidity (33) P00076,
- ☐ Suspended Solids (34) P00530,
- ☐ Suspended Solids Ash (35) P00540,
- ☐ Tot. Solids (36) P00500,
- ☐ Tot. Solids - Ash (37) P00510,
- ☐ Tot. Dissolved Solids (TDS) (38) P70300,

- ☐ pH (LAB) (39) P00403,
- ☐ Alkalinity as $CaCO_3$ (40) P00410,
- ☐ Min. Acidity as $CaCO_3$ (41) P00436,
- ☐ Chloride (42) P00940,
- ☐ MBAS (43) P38260,
- ☐ Phenols (44) P32730,
- ☐ Hardness - tot as $CaCO_3$ (45) P00900,
- ☐ Sulfate (46) P00945,
- ☐ Oil & Grease (47) P00556,
- ☐ Petroleum Hydrocarbons (48) P45501,
- ☐ Cyanide (49) P00720,

- ☑ As - tot ug/l (50) P01002, 5 K
- ☑ Cd - tot ug/l (51) P01027, 1 K
- ☐ Cr - tot ug/l (52) P01034,
- ☐ Cu - tot ug/l (53) P01042,
- ☐ Fe - tot ug/l (54) P01045,
- ☑ Hg - tot ug/l (55) P71900, 0.5 K
- ☐ Mn - tot ug/l (56) P01055,
- ☐ Ni - tot ug/l (57) P01067,
- ☐ Pb - tot ug/l (58) P01051,
- ☐ Zn - tot ug/l (59) P01092,

ADDITIONAL ANALYSIS

- ☐ _____ P_____,
- ☐ _____ P_____,
- ☐ _____ P_____,
- ☐ _____ P_____,
- ☐ _____ P_____,

REPORT SUBMITTED
JUN 14 1983

RESULTS mg/l unless otherwise noted

Chemist Review _____

NJDOH Environmental Chemistry Laboratory

Part 1 (White) - Water Quality Inventory Copy
Part 2 (Canary) - Laboratory Copy
Part 3 (Pink) - Laboratory Copy
Part 4 (Goldenrod) - Field Samplers Copy

ATTACHMENT L

Form VST-010
8/79

PLEASE TYPE OR PRINT WITH BALLPOINT PEN

STATE OF NEW JERSEY
Department of Environmental Protection
Division of Water Resources
WATER ANALYSIS

CHAIN OF CUSTODY

BACT. LAB NO.	
DATE REC'D.	
BOTTLE NO.	09175
DATE REC'D.	
STORET ENT. / READ	

MUNICIPALITY: FRANKLIN TWP	COUNTY: SOMERSET	STREAM: GW
FACILITY: WA CLEARY	LOCATION: RTE 27 & VERONICA	
REPRESENTATIVE: E E	TITLE: 204	COLL NAME: IVERSEN-SAMSEL
REMARKS: CLEARY DUG WELL		

STATION IDENTIFICATION NUMBER	YR. MO. DAY	HOUR
SC, ,	830531	1000

FIELD ANALYSIS

☐ Water Temp °C	P10,	
☐ D.O.-Winkler	P300,	
☐ D.O.-Probe	P299,	
☐ pH (Field)	P400,	
☐ Sample Depth-ft.	P3,	
☐ Gage Height-ft.	P65,	
☐ Spec. Cond. @ 25°C	P95,	
☐ Salinity °/00	P480,	
☐ Tide Stage	P70211,	

BACTERIOLOGICAL - DILUTIONS (REQUESTED)

Fecal Coliform / Total Coliform	10	1	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}
Fecal Streptococci	10	1	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}

Fecal coli /100 ml ☐ MPN P31615, ☐ MF P31613,

☐ Fecal Strept MPN /100 ml P31677,

☐ Tot coli MPN /100 ml P31505,

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) ______ SAMPLE
SEED YES ☐ NO ☐

CONC.%
BOD

☐ BOD ☐ 5-DAY P310, ☐ 6-DAY P312,

ANALYSIS	UNITS	PARAMETER	VALUE	RMKS.
☑ VO	ppb	P		
☐		P		
☐ BENZENE		P	.6	

DATE	TIME	CHAIN OF CUSTODY FROM (NAME)	TO (NAME)
			REPORT SUBMITTED
			JUN 14 1983
			NJDOH Environmental Chemistry Laboratory

Chemist Review ______________

Part 1 - Water Quality Inventory Copy
Part 2 - Chemistry Copy
Part 3 - Water Resources Copy (For Transmission
Part 4 - Bacteriology Copy

ATTACHMENT L

Form VST-010
8/79

PLEASE TYPE OR PRINT WITH BALLPOINT PEN

STATE OF NEW JERSEY
Department of Environmental Protection
Division of Water Resources
WATER ANALYSIS

CHAIN OF CUSTODY

BACT. LAB NO.	
DATE REC'D.	
BOTTLE NO.	09176
DATE REC'D.	
STORET ENT.	
STORET READ	

MUNICIPALITY FRANKLIN TWP	COUNTY SOMERSET	STREAM GW
FACILITY WA CLEARY	LOCATION RTE 27 & VERONICA	
REPRESENTATIVE EE	TITLE 204	COLL NAME IVERSEN-SAMSEL

REMARKS CLEARY PRODUCTION WELL

STATION IDENTIFICATION NUMBER: SC, ,

YR. MO. DAY: 830531

HOUR: 1100

FIELD ANALYSIS

☐ Water Temp °C	P10,	
☐ D.O.-Winkler	P300,	
☐ D.O.-Probe	P299,	
☐ pH (Field)	P400,	
☐ Sample Depth-ft.	P3,	
☐ Gage Height-ft.	P65,	
☐ Spec. Cond. @25°C	P95,	
☐ Salinity °/00	P480,	
☐ Tide Stage	P70211,	

BACTERIOLOGICAL - DILUTIONS (REQUESTED)

Fecal Coliform / Total Coliform	10	1	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}
Fecal Streptococci	10	1	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}

Fecal coli /100 ml ☐ MPN P31615, ☐ MF P31613,

☐ Fecal Strept MPN /100 ml P31677,

☐ Tot coli MPN /100 ml P31505,

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) ______ SAMPLE

SEED YES ☐ NO ☐

CONC.%

BOD

☐ BOD ☐ 5-DAY P310, ☐ 6-DAY P312,

ANALYSIS	UNITS	PARAMETER	VALUE	RMKS.
☑ * VO	ppb	P		
☐		P		
☐ Aromatic hydrocarbons		P	1	K
☐ chlorinated "		P	1	K

CHAIN OF CUSTODY

DATE	TIME	FROM (NAME)	TO (NAME)
* ONE OF FOUR	SAMPLE	HAD AN AIR BUBBLE ~~when delivered~~	TO D.O.

REPORT SUBMITTED
JUN 1 – 1983
NJDOH Environmental Chemistry Directory

Chemist Review ______

Part 1 - Water Quality Inventory Copy
Part 2 - Chemistry Copy
Part 3 - Water Resources Copy (For Transmission)
Part 4 - Bacteriology Copy

ATTACHMENT L

Form VST-010
8/79

PLEASE TYPE OR PRINT
WITH BALLPOINT PEN

STATE OF NEW JERSEY
Department of Environmental Protection
Division of Water Resources
WATER ANALYSIS

CHAIN OF CUSTODY

BACT. LAB NO. _____
DATE REC'D. _____
BOTTLE NO. 09177
DATE REC'D. _____
STORET ENT. _____ READ _____

MUNICIPALITY FRANKLIN TWP	COUNTY SOMERSET	STREAM GW
FACILITY WA CLEARY	LOCATION RTE 27	
REPRESENTATIVE EE	TITLE 204	COLL NAME IVERSEN-SAMSEL
REMARKS CLEARY ABANDONED WELL		

STATION IDENTIFICATION NUMBER: SC,

YR. MO. DAY: 830531

HOUR: 1650

FIELD ANALYSIS

☐ Water Temp °C	P10,	
☐ D.O.-Winkler	P300,	
☐ D.O.-Probe	P299,	
☐ pH (Field)	P400,	
☐ Sample Depth-ft.	P3,	
☐ Gage Height-ft.	P65,	
☐ Spec. Cond. @ 25°C	P95,	
☐ Salinity 0/00	P480,	
☐ Tide Stage	P70211,	

BACTERIOLOGICAL - DILUTIONS (REQUESTED)

	10	1	-1 10	-2 10	-3 10	-4 10	-5 10	-6 10
Fecal Coliform / Total Coliform								
Fecal Streptococci								

Fecal coli /100 ml ☐ MPN P31615, ☐ MF P31613,

☐ Fecal Strept MPN/100 ml P31677,

☐ Tot coli MPN/100 ml P31505,

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) _____ SAMPLE

SEED YES ☐ NO ☐

CONC.%			
BOD			

☐ BOD ☐ 5-DAY P310, ☐ 6-DAY P312,

ANALYSIS	UNITS	PARAMETER	VALUE	RMKS
☑* VO	ppb	P		
☐		P		
☐ CHLOROFORM		P	7	
☐ 1,1,2,2 TETRACHLOROETHANE		P	18	
☐ BENZENE		P	9700	
☐ 1,3,5 TRIMETHYLBENZENE		P	20	
☐ 1,2,4 TRIMETHYLBENZENE		P	15	
☐ P-DICHLOROBENZENE		P	98	
☐ O-DICHLOROBENZENE		P	36	
☐ 2,3 BENZOFURAN		P	22	
☐ HEXACHLORBUTADIENE		P	180	
☐ NAPHTHALENE		P	35	
☐		P		
☐ +18 UNIDENTIFIED		P		
☐ PEAKS		P		
☐		P		
☐		P		
☐		P		
☐		P		
☐		P		
☐		P		
☐		P		
☐		P		
☐		P		
☐		P		
☐		P		
☐		P		

DATE * ONLY FIND 3 VIALS IN SET

CHAIN OF CUSTODY FROM (NAME)

TO (NAME) REPORT SUBMITTED

JUN 1 = 1983

NJDEP Environmental Chemistry Laboratory

Chemist Review _____

Part 1 - Water Quality Inventory Copy
Part 2 - Chemistry Copy
Part 3 - Water Resources Copy (For Transmission)
Part 4 - Bacteriology Copy

ATTACHMENT L

Form VST-010
8/79
PLEASE TYPE OR PRINT
WITH BALLPOINT PEN

STATE OF NEW JERSEY
Department of Environmental Protection
Division of Water Resources
WATER ANALYSIS

CHAIN OF CUSTODY

BACT. LAB NO. ____
DATE REC'D. ____
BOTTLE NO. 09179
DATE REC'D. ____
STORET ENT. ____
READ ____

MUNICIPALITY: FRANKLIN TWP	COUNTY: SOMERSET	STREAM: GW	
FACILITY: W A CLEARY	LOCATION: RTE 27		
REPRESENTATIVE: E E	TITLE: 204	COLL NAME: IVERSEN - SAMSEL	
REMARKS: CLEARY CONTAMINATED LAGOON			

STATION IDENTIFICATION NUMBER: SC, | YR. MO. DAY: 830531 | HOUR: 1245

FIELD ANALYSIS

- ☐ Water Temp °C P10,
- ☐ D.O.-Winkler P300,
- ☐ D.O.-Probe P299,
- ☐ pH (Field) P400,
- ☐ Sample Depth-ft. P3,
- ☐ Gage Height-ft. P65,
- ☐ Spec. Cond. @ 25°C P95,
- ☐ Salinity °/00 P480,
- ☐ Tide Stage P70211,

BACTERIOLOGICAL - DILUTIONS (REQUESTED)

	10	1	-1 10	-2 10	-3 10	-4 10	-5 10	-6 10
Fecal Coliform / Total Coliform								
Fecal Streptococci								

Fecal coli /100 ml ☐ MPN P31615, ☐ MF P31613,

☐ Fecal Strept MPN /100 ml P31677,

☐ Tot coli MPN /100 ml P31505,

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) ____ SAMPLE
SEED YES ☐ NO ☐

CONC. %			
BOD			

☐ BOD ☐ 5-DAY P310, ☐ 6-DAY P312,

ANALYSIS	UNITS	PARAMETER	VALUE	RMKS.
✓ VO	ppb	P		J
☐ CHLOROFORM		P	7	
☐ 1,1,2 TRICHLOROETHANE		P	81	
☐ + 5 UNIDENTIFIED PEAKS		P		

J = INTERFERENCE IN THE SURROGATE

DATE ____ TIME ____ CHAIN OF CUSTODY FROM (NAME) ____

REPORT SUBMITTED
JUN 14 1983
NJDOH Environmental Chemistry Laboratory

Chemist Review ____

Part 1 - Water Quality Inventory Copy
Part 2 - Chemistry Copy
Part 3 - Water Resources Copy (For Transmission
Part 4 - Bacteriology Copy

ATTACHMENT L

Form VST-010
8/79

PLEASE TYPE OR PRINT
WITH BALLPOINT PEN

STATE OF NEW JERSEY
Department of Environmental Protection
Division of Water Resources
WATER ANALYSIS

CHAIN OF CUSTODY

BACT. LAB NO. _____
DATE REC'D. _____
BOTTLE NO. 09180
DATE REC'D. _____
STORET ENT. _____ READ _____

MUNICIPALITY FRANKLIN TWP	COUNTY SOMERSET	STREAM GW	
FACILITY W A CLEARY	LOCATION RTE 27		
REPRESENTATIVE EE	TITLE 204	COLL NAME IVERSEN-SAMSEL	
REMARKS NEAR WELL No. 3 SAMPLE #1 6" DOWN UPGRADIENT			

STATION IDENTIFICATION NUMBER — YR. MO. DAY — HOUR

SOIL — SC, — 830531 — 1415

FIELD ANALYSIS

- ☐ Water Temp °C P10,
- ☐ D.O.-Winkler P300,
- ☐ D.O.-Probe P299,
- ☐ pH (Field) P400,
- ☐ Sample Depth-ft. P3,
- ☐ Gage Height-ft. P65,
- ☐ Spec. Cond. @ 25°C P95,
- ☐ Salinity °/00 P480,
- ☐ Tide Stage P70211,

BACTERIOLOGICAL - DILUTIONS (REQUESTED)

Fecal Coliform Total Coliform	10	1	-1 10	-2 10	-3 10	-4 10	-5 10	-6 10
Fecal Streptococci	10	1	-1 10	-2 10	-3 10	-4 10	-5 10	-6 10

Fecal coli /100 ml ☐ MPN P31615, ☐ MF P31613,

☐ Fecal Strept MPN /100 ml P31677,

☐ Tot coli MPN /100 ml P31505,

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) _____ SAMPLE

SEED YES ☐ NO ☐

CONC. %			
BOD			

☐ BOD ☐ 5-DAY P310, ☐ 6-DAY P312,

✓	ANALYSIS	UNITS	PARAMETER	VALUE	RMKS.
✓	VO	ppb	P	NONE DETECTED	

DATE | TIME | CHAIN OF CUSTODY FROM (NAME) | REPORT TO (NAME) SUBMITTED

JUN 14 1983

NJDOH Environmental Chemistry Laboratory

Chemist Review _____

Part 1 - Water Quality Inventory Copy
Part 2 - Chemistry Copy
Part 3 - Water Resources Copy (For Transmission)
Part 4 - Bacteriology Copy

ATTACHMENT 5

Form VST-010
8/79

PLEASE TYPE OR PRINT
WITH BALLPOINT PEN

STATE OF NEW JERSEY
Department of Environmental Protection
Division of Water Resources
WATER ANALYSIS

CHAIN OF CUSTODY

BACT. LAB NO.	
DATE REC'D.	
BOTTLE NO.	09181
DATE REC'D.	
STORET ENT.	
READ	

MUNICIPALITY FRANKLIN TWP	COUNTY SOMERSET	STREAM GW
FACILITY WA CLEARY	LOCATION RTE 27	
REPRESENTATIVE EE	TITLE 204	COLL NAME IVERSEN – SAMSEL

REMARKS NEAR WELL No. 3 ~~CLOSE~~ BETWEEN CONCRETE PADS 6" DOWN UPGRADIENT SAMPLE No. 2

SOIL

STATION IDENTIFICATION NUMBER: S C ,
YR. MO. DAY: 830531
HOUR: 1430

FIELD ANALYSIS

- ☐ Water Temp °C P10,
- ☐ D.O.-Winkler P300,
- ☐ D.O.-Probe P299,
- ☐ pH (Field) P400,
- ☐ Sample Depth-ft. P3,
- ☐ Gage Height-ft. P65,
- ☐ Spec. Cond. @25°C P95,
- ☐ Salinity 0/00 P480,
- ☐ Tide Stage P70211,

BACTERIOLOGICAL - DILUTIONS (REQUESTED)

Fecal Coliform / Total Coliform	10	1	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}
Fecal Streptococci	10	1	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}

Fecal coli /100 ml ☐ MPN P31615, ☐ MF P31613,

☐ Fecal Strept MPN /100 ml P31677,

☐ Tot coli MPN /100 ml P31505,

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) ______ SAMPLE

SEED YES ☐ NO ☐

CONC. %

BOD

☐ BOD ☐ 5-DAY P310, ☐ 6-DAY P312,

ANALYSIS	UNITS	PARAMETER	VALUE	RMKS
☑ VO	ppb	P	NONE DETECTED	

DATE	TIME	CHAIN OF CUSTODY FROM (NAME)	TO (NAME)
			REPORT SUBMITTED
			JUN 14 1983
			NJDOH Environmental Chemistry Laboratory

Chemist Review ______

Part 1 - Water Quality Inventory Copy
Part 2 - Chemistry Copy
Part 3 - Water Resources Copy (For Transmission)
Part 4 - Bacteriology Copy

ATTACHMENT L

Form VST-010
8/79

PLEASE TYPE OR PRINT
WITH BALLPOINT PEN

STATE OF NEW JERSEY
Department of Environmental Protection
Division of Water Resources

WATER ANALYSIS

CHAIN OF CUSTODY

BACT. LAB NO. ____
DATE REC'D. ____
BOTTLE NO. 09182
DATE REC'D. ____
STORET ENT. ____
READ ____

MUNICIPALITY FRANKLIN TWP	COUNTY SOMERSET	STREAM GW
FACILITY W A CLEARY	LOCATION RTE 27	
REPRESENTATIVE EE	TITLE 204	COLL NAME IVERSEN-SAMSEL
REMARKS BETWEEN No. 5 AND LAGOON- SURFACE SAMPLE THICK GREEN LAYER		

STATION IDENTIFICATION NUMBER | YR. MO. DAY | HOUR

SOIL — SC, | 830531 | 1440

FIELD ANALYSIS

- ☐ Water Temp °C P10,
- ☐ D.O.-Winkler P300,
- ☐ D.O.-Probe P299,
- ☐ pH (Field) P400,
- ☐ Sample Depth-ft. P3,
- ☐ Gage Height-ft. P65,
- ☐ Spec. Cond. @ 25°C P95,
- ☐ Salinity ‰ P480,
- ☐ Tide Stage P70211,

BACTERIOLOGICAL - DILUTIONS (REQUESTED)

	10	1	-1 10	-2 10	-3 10	-4 10	-5 10	-6 10
Fecal Coliform / Total Coliform								
Fecal Streptococci								

Fecal coli /100 ml ☐ MPN P31615, ☐ MF P31613,

☐ Fecal Strept MPN /100 ml P31677,

☐ Tot coli MPN /100 ml P31505,

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) ____ SAMPLE
SEED YES ☐ NO ☐

CONC.%			
BOD			

☐ BOD ☐ 5-DAY P310, ☐ 6-DAY P312,

ANALYSIS	UNITS	PARAMETER	VALUE	RMKS.
✓ VO	ppb	P		
		P		
☐ BENZENE		P	1500	
		P		
		P		
		P		
		P		
		P		
		P		
		P		
		P		
		P		
		P		
		P		
		P		
		P		
		P		
		P		
		P		
		P		
		P		
		P		
		P		
		P		
		P		
		P		
		P		
		P		

DATE	TIME	CHAIN OF CUSTODY FROM (NAME)	TO (NAME)
			REPORT SUBMITTED JUN 14 1983 NJDOH Environmental Chemistry Laboratory

Chemist Review ____

Part 1 - Water Quality Inventory Copy
Part 2 - Chemistry Copy
Part 3 - Water Resources Copy (For Transmissio
Part 4 - Bacteriology Copy

ATTACHMENT L

Form VST-010
8/79
PLEASE TYPE OR PRINT
WITH BALLPOINT PEN

STATE OF NEW JERSEY
Department of Environmental Protection
Division of Water Resources
WATER ANALYSIS

BACT. LAB NO.	
DATE REC'D.	
BOTTLE NO.	09183
DATE REC'D.	
STORET ENT. READ	

MUNICIPALITY FRANKLIN TWP	COUNTY SOMERSET	STREAM GW
FACILITY WA CLEARY	LOCATION RTE 27	
REPRESENTATIVE EE	TITLE 204	COLL NAME IVERSEN-SAMSEL

REMARKS BETWEEN LAGOON AND No. 5 — 6" DOWN
CLAYEY MATERIAL

SOIL

STATION IDENTIFICATION NUMBER	YR. MO. DAY	HOUR
SC,	830531	1445

FIELD ANALYSIS

☐ Water Temp °C	P10,	
☐ D.O.-Winkler	P300,	
☐ D.O.-Probe	P299,	
☐ pH (Field)	P400,	
☐ Sample Depth-ft.	P3,	
☐ Gage Height-ft.	P65,	
☐ Spec. Cond. @ 25°C	P95,	
☐ Salinity °/oo	P480,	
☐ Tide Stage	P70211,	

✓	ANALYSIS	UNITS	PARAMETER	VALUE	RMKS
☑	VO	ppb	P	NONE DETECTED	

BACTERIOLOGICAL - DILUTIONS (REQUESTED)

Fecal Coliform / Total Coliform	10	1	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}
Fecal Streptococci	10	1	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}

Fecal coli /100 ml ☐ MPN P31615, ☐ MF P31613,

☐ Fecal Strept MPN /100 ml P31677,

☐ Tot coli MPN /100 ml P31505,

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) ________ SAMPLE

SEED YES ☐ NO ☐

CONC. %

BOD

☐ BOD ☐ 5-DAY P310, ☐ 6-DAY P312,

CHAIN OF CUSTODY

DATE	TIME	FROM (NAME)	TO (NAME)
			REPORT SUBMITTED JUN 14 1983 NJDOH Environmental Chemistry Laboratory

Chemist Review ________________

Part 1 - Water Quality Inventory Copy
Part 2 - Chemistry Copy
Part 3 - Water Resources Copy (For Transmission)
Part 4 - Bacteriology Copy

ATTACHMENT L

Form VST-010
8/79

PLEASE TYPE OR PRINT
WITH BALLPOINT PEN

STATE OF NEW JERSEY
Department of Environmental Protection
Division of Water Resources
WATER ANALYSIS

CHAIN OF CUSTODY

MUNICIPALITY FRANKIN TWP	COUNTY SOMERSET	STREAM GW
FACILITY IN A CLEARY	LOCATION RTE 27	
REPRESENTATIVE EE	TITLE 204	COLL NAME IVERSEN - SAMSEL
REMARKS CONTAMINATED AREA ALONG TREE LINE NEAR WELL No. 6		

BACT. LAB NO. ______
DATE REC'D. ______
BOTTLE NO. 09184
DATE REC'D. ______
STORET ENT. ______ READ ______

SOIL

STATION IDENTIFICATION NUMBER	YR. MO. DAY	HOUR
S C ,	8 3 0 5 3 1	1 5 2 5

FIELD ANALYSIS

☐ Water Temp °C	P10,	
☐ D.O.-Winkler	P300,	
☐ D.O.-Probe	P299,	
☐ pH (Field)	P400,	
☐ Sample Depth-ft.	P3,	
☐ Gage Height-ft.	P65,	
☐ Spec. Cond. @ 25°C	P95,	
☐ Salinity 0/00	P480,	
☐ Tide Stage	P70211,	

ANALYSIS	UNITS	PARAMETER	VALUE	RMKS.
☑ VO	ppb	P	NONE DETECTED	

BACTERIOLOGICAL - DILUTIONS (REQUESTED)

Fecal Coliform / Total Coliform	10	1	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}
Fecal Streptococci	10	1	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}

Fecal coli /100 ml ☐ MPN P31615, ☐ MF P31613,

☐ Fecal Strept MPN /100 ml P31677,

☐ Tot coli MPN /100 ml P31505,

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) ________ SAMPLE

SEED YES ☐ NO ☐

CONC.%

BOD

☐ BOD ☐ 5-DAY P310, ☐ 6-DAY P312,

DATE	TIME	CHAIN OF CUSTODY FROM (NAME)	TO (NAME)
			REPORT SUBMITTED
			JUN 14 1983
			NJDOH Environmental Chemistry Laboratory

Chemist Review ______________________

Part 1 - Water Quality Inventory Copy Part 3 - Water Resources Copy (For Transmission)
Part 2 - Chemistry Copy Part 4 - Bacteriology Copy

ATTACHMENT L

Form VST-010
8/79
PLEASE TYPE OR PRINT
WITH BALLPOINT PEN

STATE OF NEW JERSEY
Department of Environmental Protection
Division of Water Resources
WATER ANALYSIS

CHAIN OF CUSTODY

BACT. LAB NO.	
DATE REC'D.	
BOTTLE NO.	09125
DATE REC'D.	
STORET ENT. READ	

MUNICIPALITY: FRANKLIN TWP
COUNTY: SOMERSET
STREAM: GW
FACILITY: WA CLEARY
LOCATION: RTE 27
REPRESENTATIVE: EE
TITLE: 204
COLL NAME: IVERSEN-SAMSEL
REMARKS: ROTTED CARDBOARD SIDED DRUM AREA BEHIND GARDEN NEAR BICYCLE 6" DOWN

SOIL

STATION IDENTIFICATION NUMBER: SC.
YR. MO. DAY: 830531
HOUR: 1500

FIELD ANALYSIS

- ☐ Water Temp °C P10,
- ☐ D.O.-Winkler P300,
- ☐ D.O.-Probe P299,
- ☐ pH (Field) P400,
- ☐ Sample Depth-ft. P3,
- ☐ Gage Height-ft. P65,
- ☐ Spec. Cond. @ 25°C P95,
- ☐ Salinity 0/00 P480,
- ☐ Tide Stage P70211,

BACTERIOLOGICAL - DILUTIONS (REQUESTED)

Fecal Coliform / Total Coliform	10	1	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}
Fecal Streptococci	10	1	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}

Fecal coli /100 ml ☐ MPN P31615, ☐ MF P31613,

☐ Fecal Strept MPN /100 ml P31677,

☐ Tot coli MPN /100 ml P31505,

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) ________ SAMPLE
SEED YES ☐ NO ☐

CONC. %			
BOD			

☐ BOD ☐ 5-DAY P310, ☐ 6-DAY P312,

ANALYSIS	UNITS	PARAMETER	VALUE	RMKS.
☑ VO	ppb	P	NONE DETECTED	

DATE	TIME	CHAIN OF CUSTODY FROM (NAME)	TO (NAME)

REPORT SUBMITTED
JUN 14 1983
~~NJDOH Environmental Chemistry Laboratory~~

Chemist Review ________________

Part 1 - Water Quality Inventory Copy
Part 2 - Chemistry Copy
Part 3 - Water Resources Copy (For Transmission
Part 4 - Bacteriology Copy

ATTACHMENT L

Form VST-001
7/81

STATE OF NEW JERSEY
Department of Environmental Protection
Water Analysis

PLEASE TYPE OR PRINT WITH BALLPOINT PEN

BACT. LAB NO. ____
DATE REC'D. ____
BOTTLE NO. 09186
DATE REC'D ____
STORET ENT. ____ READ ____

MUNICIPALITY FRANKLIN TWP	COUNTY SOMERSET	STREAM GW
FACILITY WA CLEARY	LOCATION RTE 27	
REPRESENTATIVE EE	TITLE 204 1 VEASEY	COLL NAME SAMSEL
REMARKS CLEARY ABANDONED WELL		

Station Identification Number: SC, [ ] . YR. MO. DAY: 830531 HOUR: 1650 (1) Sample No.: PB, [ ]

FIELD ANALYSIS

- ☐ Water Temp. °C. (2) P00010,
- ☐ D.O. - Winkler (3) P00300,
- ☐ D.O. - Probe (4) P00299,
- ☐ pH (Field). (5) P00400,
- ☐ Sample Depth-ft. (6) P00003,
- ☐ Stream Flow-CFS (7) P00061,
- ☐ Gage Height-ft. (8) P00065,
- ☐ Spec. Cond. @ 25°C (9) P00095,
- ☐ Salinity °/00 (10) P00480,
- ☐ Tide Stage (11) P70211,

CONDITION CODES

- ☐ Weather Conditions (12) P00041,
- ☐ Flow Severity (13) P01351,
- ☐ _____ Severity (14) P013_ _,
- ☐ _____ Severity (15) P013_ _,

NUTRIENTS

LEVEL ☐ HIGH ☐ LOW

- ☐ NO_2 - N (16) P00615,
- ☐ $NO_2 + NO_3$ - N (17) P00630,
- ☐ NH_3 - N (18) P00610,
- ☐ Tot. Kjeldahl N (19) P00625,
- Ortho - PO_4 as P ☐ (20) P70507, ☐ (21) P00660,
- Phosphorus-tot as P PO_4 ☐ (22) P00665, ☐ (23) P00650,

BACTERIOLOGICAL — DILUTIONS (REQUESTED)

	1/10	1	1/10	1/10	1/10	1/10	1/10	1/10
Fecal Coliform								
Total Coliform								
Fecal Streptococci	1/10	1	1/10	1/10	1/10	1/10	1/10	1/10

- Fecal coli #100 ml ☐ MPN (24) P31615, ☐ MF (25) P31613,
- ☐ Fecal Strept MPN/100ml (26) P31677,
- ☐ Tot coli MPN/100 ml (27) P31505,

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) _____ SAMPLE
SEED ☐ YES ☐ NO ☐

CONC. %			
BOD			

- ☐ BOD 5-DAY (28) P310, 6-DAY (29) P312,
- ☐ COD (30) P340,
- ☐ TOC (31) P00680,
- ☐ Color Pt - Cou (32) P00080,
- ☐ Turbidity (33) P00076,
- ☐ Suspended Solids (34) P00530,
- ☐ Suspended Solids Ash (35) P00540,
- ☐ Tot. Solids (36) P00500,
- ☐ Tot. Solids - Ash (37) P00510,
- ☐ Tot. Dissolved Solids (TDS) (38) P70300,

- ☐ pH (LAB) (39) P00403,
- ☐ Alkalinity as $CaCO_3$ (40) P00410,
- ☐ Min. Acidity as $CaCO_3$ (41) P00436,
- ☐ Chloride (42) P00940,
- ☐ MBAS (43) P38260,
- ☐ Phenols (44) P32730,
- ☐ Hardness - tot as $CaCO_3$ (45) P00900,
- ☐ Sulfate (46) P00945,
- ☐ Oil & Grease (47) P00556,
- ☐ Petroleum Hydrocarbons (48) P45501,
- ☐ Cyanide (49) P00720,

- ☑ As - tot ug/l (50) P01002, 70
- ☑ Cd - tot ug/l (51) P01027, 2
- ☐ Cr - tot ug/l (52) P01034,
- ☐ Cu - tot ug/l (53) P01042,
- ☐ Fe - tot ug/l (54) P01045,
- ☑ Hg - tot ug/l (55) P71900, 0.5
- ☐ Mn - tot ug/l (56) P01055,
- ☐ Ni - tot ug/l (57) P01067,
- ☐ Pb - tot ug/l (58) P01051,
- ☐ Zn - tot ug/l (59) P01092,

ADDITIONAL ANALYSIS

- ☐ _____ P_____
- ☐ _____ P_____
- ☐ _____ P_____
- ☐ _____ P_____
- ☐ _____ P_____

RESULTS mg/l unless otherwise noted

REPORT SUBMITTED
JUN 14 1983

Chemist Review _____

NJDOH Environmental Chemistry Laboratory

Part 1 (White) - Water Quality Inventory Copy
Part 2 (Canary) - Laboratory Copy
Part 3 (Pink) - Laboratory Copy
Part 4 (Goldenrod) - Field Samplers Copy

ATTACHMENT L

LEARY CHEMICAL
CORPORATION
P.O. Box 10, 1049 Somerset Street
Somerset, N.J. 08873 (201) 247-8000

May 12 1981

RECEIVED

MAY 14 1981

N. J. DEPT. OF ENVIRONMENTAL PROTECTION
BUREAU OF AIR POLLUTION CONTROL

Byron B. Sullivan, Supervisor
Central Field Office
Bureau of Air Pollution Control
Div. Environmental Protection
John Fitch Plaza, CN027
Trenton, N.J. 08625

Mailed to: 65 Prospect St.
Trenton, N.J. 08618

Dear Mr. Sullivan:

In reply to your letter of April 30th regarding the discharge of Benzene into the atmosphere from our reactor, I will attempt to answer the four questions/comments to the best of my ability.

1-4) I regret that I had used the word "Nil" for emissions, when after following your suggestion of using material balance calculations, I am able to report an accurate yearly emission.

In the manufacture of phenylmercuric acetate (PMA) we bought 8000 lbs. of benzene last year. There were 3680 lbs. used for PMA, and 4380 lbs. of benzene lost through evaporation from our stack which was not returned via condensation. This represented 40 sixteen hour batches or 640 refluxing and distillation hours. Therefore, our emission was:

5.75 lb/hour during reaction, or
4380 lb/ year

The reactor is outside. Benzene is purchased in drums. It requires pumping 200 lbs. of makeup Benzene into each batch which is also performed outside by an operator who pumps from a closed head drum into the reactor.

I trust that I have supplied you with sufficient data to evaluate our emission of volatile benzene vapors.

Very truly yours,

Paul Sartoretto

Paul Sartoretto, Ph.D.
Technical Director

enc. 2

ATTACHMENT N

U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

CITATION and NOTIFICATION OF PENALTY

Belle Mead Area Office
GSA Belle Mead Depot, Bldg. T-3
Belle Mead, NJ 08502

ISSUANCE DATE	OSHA NUMBER	
9/22/82	K7622 056	
REGION	AREA	PAGE
02	2140	1 OF 3

TYPE OF VIOLATION(S)	CITATION NO.
SERIOUS	1

INSPECTION DATE:
6/17-9/20/82

INSPECTION SITE:
1049 Somerset St.
Somerset, NJ

CERTIFIED MAIL - RRR

TO:
W.A. Cleary Corp.
and its successors
Post Office Box 10-1049 Somerset St.
Somerset, NJ 08873
ATTN: Dr. Clayton Nelson, Vice President

THE LAW REQUIRES that a copy of this Citation be posted immediately in a prominent place at or near the location of the violation(s) cited below. The Citation must remain posted until the violations cited below have been corrected, or for 3 working days (excluding weekends and Federal holidays) whichever is longer.

PENALTIES ARE DUE WITHIN 15 DAYS OF RECEIPT OF THIS NOTIFICATI UNLESS CONTESTED (See enclosed Booklet)

This Section M Be Detached Before Posting

This citation describes violations of the Occupational Safety and Health Act of 1970. The penalty(ies) listed below are based on these violations. You must correct the violations referred to in this citation by the dates listed below and pay the penalties proposed, unless within 15 working days (excluding weekends and Federal holidays) from your receipt of this citation and penalty you mail a notice of contest to the U.S. Department of Labor Area Office at the address shown above. (See the enclosed booklet which outlines your responsibilities and courses of action and should be read in conjunction with this form.)

ITEM NUMBER, STANDARD, REGULATION OR SECTION OF THE ACT VIOLATED; DESCRIPTION	DATE BY WHICH VIOLATION MUST BE CORRECTED	PENALTY
The issuance of this citation does not constitute a finding that a violation of the Act has occurred unless there is a failure to contest as provided for in the Act or, if contested, unless the citation is affirmed by the Review Commission.		
The violations described in this citation are alleged to have occurred on or about the day the inspection was made unless otherwise indicated within the description given below.		
The alleged violations below (1a, 1b, 1c, 1d, 1e, 1f, 1g, and 1h) have been grouped because they involve similar or related hazards that may increase the potential for injury resulting from an accident.		
1a 29 CFR 1910.134(a)(2): The employer did not establish and maintain a respiratory protection program which included the requirements outlined in paragraph (b) of this section: a) For the chemical operator/formulators exposed to Thiram while hand dumping the material into reactor vessel #1.	11/1/82	$200
1b 29 CFR 1910.134(b)(1): Written standard operating procedures governing the selection and use of respirators were not established: a) For all employees utilizing half mask respirators when charging Thiram into the reactor vessels.	10/5/82	
1c 29 CFR 1910.134(b)(3): The users of respirators were not instructed and trained in the proper use of respirators and their limitations: a) All employees utilizing half mask respirators when charging Thiram into the reactor vessels.	11/1/82	
1d 29 CFR 1910.134(b)(5): Respirators were not regularly cleaned and disinfected: a) For all employees utilizing half mask respirators when charging Thiram into the reactor vessels.	ATTACHMENT 10/5/82	N

AREA DIRECTOR: JAMES W. CONLON — Richard Washington — 9-23-82

See los page

NOTICE TO EMPLOYEES – The law gives an employee or his representative the opportunity to object to any abatement date set for a violation if he believes the date to be unreasonable. The contest must be mailed to the U.S. Department of Labor Area Office at the address shown above within 15 working days (excluding weekends and Federal holidays) of the receipt by the employer of this citation and penalty.

EMPLOYER DISCRIMINATION UNLAWFUL – The law prohibits discrimination by an employer against an employee for filing a complaint or for exercising any rights under this Act. An employee who believes that he has been discriminated against may file a complaint no later than 30 days after the discrimination with the U.S. Department of Labor Area Office at the address shown above.

TOTAL PENA FOR THI CITATIO

Make check or M Order Payabl "DOL-OSH Indicate OSH on Remitta

EMPLOYER RESPONSIBILITIES AND COURSES OF ACTION – The enclosed booklet outlines employer responsibilities and courses of action and should be read in conjunction with this notification.

N

CITATION and NOTIFICATION OF PENALTY

ISSUANCE DATE	OSHA NUMBER
[redacted]/82	K7622 056
REGION 02	AREA 2140
	PAGE 2 OF 3

Belle Mead Area Office
GSA Belle Mead Depot, Bldg. T-3
Belle Mead, NJ 08502

TYPE OF VIOLATION(S)	CITATION NO.
SERIOUS	1

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6/17-9/20/82
INSPECTION SITE:
1049 Somerset St.
Somerset, NJ

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ITEM NUMBER, STANDARD, REGULATION OR SECTION OF THE ACT VIOLATED; DESCRIPTION	DATE BY WHICH VIOLATION MUST BE CORRECTED	PENALT
1e 29 CFR 1910.134(b)(6): Respirators were not stored in a convenient, clean and sanitary location: a) For all employees utilizing half mask respirators when charging Thiram into the reactor vessels.	10/5/82	
1f 29 CFR 1910.134(e)(5): Training did not provide the individuals with the opportunity to handle the respirator, have it fitted properly, test its face-piece-to-face seal, wear it in normal air for a long familiarity period, and finally wear it in a test atmosphere: a) For all employees utilizing half maks respirators when charging Thiram into the reactor vessels.	11/1/82	
1g 29 CFR 1910.1000(a)(2): Employee(s) were exposed to material(s) in excess of the 8-hour time weighted average limit(s) listed for the particular material(s) in table Z-1 of subpart Z of 29 CFR part 1910: a) The chemical operator/formulator was exposed to Thiram while hand dumping the material into reactor vessel #1.	1/3/83	
1h 29 CFR 1910.1000(e): Feasible administrative or engineering controls were not determined and implemented to reduce employee exposure(s): a) The chemical operator/formulator was exposed to Thiram while hand dumping the material into reactor vessel #1.	*Step 1 12/1/82 *Step 2 1/3/83	
The combination of the above alleged violations (1a thru 1h) affected the overall gravity of possible illness and contributed to the serious nature of the alleged violation. *Step 1 - Submit to the Area Director a written detailed plan of abatement outlining a schedule for the implementation of engineering and/or administrative measures to control employee exposures to hazardous substances as referenced in this citation. This plan shall include, at a minimum, target dates for the following actions which should be consistent with the dates required by this citation:		

AREA DIRECTOR Theodore Wangler for 9-23-82
JAMES W. CONLON

See last page

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Make check or Order Payab "DOL-OSH Indicate OSH on Remitt

CITATION AND NOTIFICATION OF PENALTY
DUPLICATE

OSHA-2 REV. 5/76

N

CITATION and NOTIFICATION OF PENALTY

Belle Mead Area Office
GSA Belle Mead Depot, Bldg. T-3
Belle Mead, NJ 08502

ISSUANCE DATE	OSHA NUMBER
9 [illegible] 82	K7622 056
REGION 02	AREA 2140
	PAGE 3 OF 3

TYPE OF VIOLATION(S)	CITATION NO.
SERIOUS	1

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ITEM NUMBER STANDARD, REGULATION OR SECTION OF THE ACT VIOLATED; DESCRIPTION	DATE BY WHICH VIOLATION MUST BE CORRECTED	PENALT

(a) Evaluation of the extent and location of the hazard source;

(b) Evaluation of control measure options;

(c) Selection of optimum control measure(s);

(d) Determination of control measure design;

(e) Ordering and delivery of equipment and materials;

(f) Installation of control measures;

(g) Training of employees in the proper operation and maintenance of the newly implemented control measures; and

(h) Assurance of effective performance of control measures.

All proposed control measures shall be approved for each particular use by a competent industrial hygienist or other technically qualified person. Ninety (90) day progress reports are required during the abatement period.

*Step 2 - Correction shall be completed by the implementation of feasible engineering and/or administrative controlls and their effectiveness at achieving compliance verified.

AREA DIRECTOR JAMES W. CONLON [signature] 9-23-82

$200

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N

ADM-012

NEW JERSEY STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION

MEMO

TO FILE

FROM ROBERT RAISCH, HSMS III, BUREAU OF PLANNING AND ASSESSMENT DATE JUL 25 1988

SUBJECT W.A. CLEARY, WINDSHIELD SURVEY

On July 25, 1988, a windshield survey was conducted at the W.A. Cleary site in Franklin Township. The facility was observed to be active and is accessable via a driveway next to the Tara Greens Golf Course off Somerset Street.

The site is accessible from the golf course and surrounding properties due to a lack of a fence or other form or site security. The area the site is located in is predominantly commercial and light industrial.

RR:mz

ATTACHMENT O